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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 17 MARCH, 1934 NUMBER 3

HEREDITARY OPTIC ATROPHY (LEBER'S DISEASE)

ARTHUR J. BEDELL, M.D.
ALBANY, NEW YORK

Eight cases of hereditary atrophy of the optic nerve which occurred in five generations, involving three parent stocks, are discussed. The disease was traceable to one woman in whose descendants it recurred repeatedly, the other two stocks being free until contaminated by her stock. X-ray studies of the sella turcica and optic foramen in the cases observed yielded no clue as to the etiology of the disease. Syphilis was not a factor in any of them, but in the discussion the history of a case is submitted in which the disease antedated the luetic infection by many years. In this series the disease was not restricted to males. Read before the American Ophthalmological Society on June 8, 1933, at Washington, D.C.

Hereditary optic atrophy—Leber's disease—is an atrophy of the optic nerve which usually begins at puberty or in early youth. It is characterized by a rapid loss of vision, contraction of the visual field, and a central scotoma. Occasionally, a slight improvement follows the primary loss of vision, although usually there is little or no change. The appearance of the disc is in no way distinctive. Some authors have considered the causative factor to be a defect in the region of the sella turcica, but this theory has not been substantiated. Treatment seems to exert no influence on the course of the disease. It is a baffling malady, surrounded with uncertainty as to diagnosis, cause, and treatment.

When Leber described the disease in 1871, he cited all the essential clinical facts. Since then many articles covering the condition have been published, and the disease has probably been recognized in all parts of the world, so that a bibliographic résumé will not be attempted, but attention is called to Miss Julia Bell's comprehensive summary. This investigator has made a complete digest of all the reported cases of hereditary optic atrophy, and has placed the material in a readily accessible, easily comprehended volume. The bibliography seems to be complete, the digests are clear, and the pedigree charts are most illuminating. All who are interested are referred to her work.

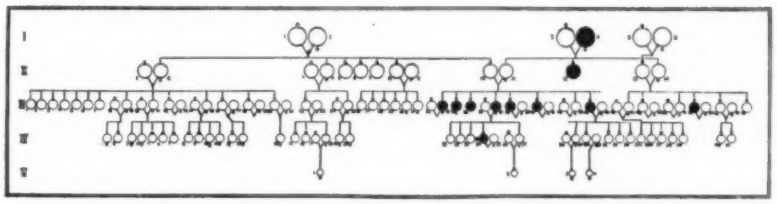

Fig. 1 (Bedell). Pedigree chart. Male ♂; female ♀. Black circles indicate patients suffering from hereditary optic atrophy. Close inspection will enable the observer to trace the parent stock of each affected patient.

Our discussion concerns five generations from three separate parent stocks, and confirms the well-recognized theory of transmission through the maternal side. Members of these families have been under observation since 1909, and twenty-one years ago, in the discussion of Dr. Bruner's paper before this Society, a short clinical abstract of some of the cases was presented. Since then we have been tracing the families, exam-

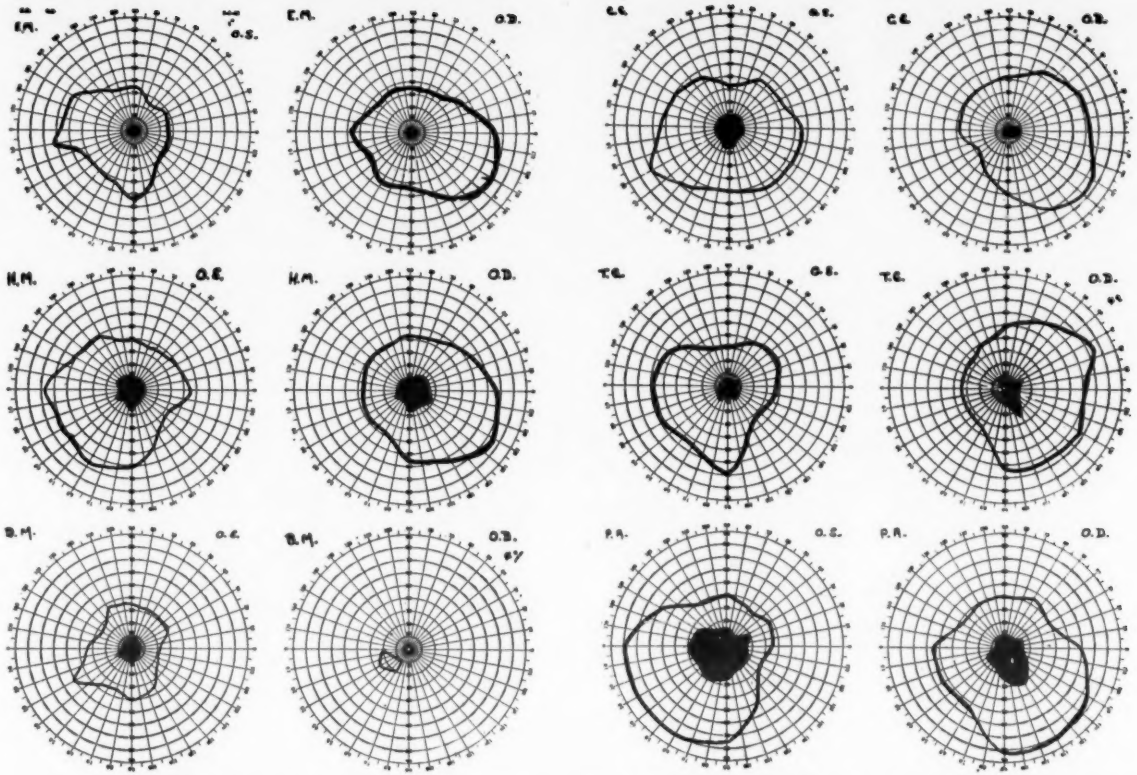

Fig. 2 (Bedell). Collected fields showing the outline for white and the absolute central scotomas made on the Ferree-Rand perimeter with 1° target, unless otherwise specified.

ining the living members, and verifying the physical findings, which are herewith recorded.

T. M. (II 10), aged eighty-two years, married into the "B" family. When examined March 24, 1932, the vision of the right eye was 20/30. The fundus was negative with the exception of a slight arteriosclerosis. The vision of the left eye was 20/50. There were many spicules in the anterior adult nucleus of the lens. The fundus was similar to that of the right eye. The patient's wife (II 11) died when she was sixty years of age. She had never had any eye disease.

E. M. (III 35) was first seen December 6, 1911, when he was sixteen years of age. He had never had any illness. The patient awoke one morning and found that he could not see. For two weeks he had to be led about, after which his sight gradually returned to the degree of acuity which he has now. The vision of the right eye was 20/200. The pupil was 7 mm., regular and active; the media were clear; the disc was sharply outlined and bluish-white in color. The veins were normal

Fig. 3 (Bedell). Radiographic reproductions made from stereoscopic plates. The variations in the size of the sinuses and the sella-turcica regions can be seen.

(a) E. M. (b) C. M. G.
(c) H. M. (d) T. G.
(e) B. M. (f) P. A.

in size and distribution, but the arteries were smaller than usual. The vision of the left eye was 20/200. The pupil measured 7 mm. and was regular and active; the media were clear; the disc was sharply outlined and bluish-white in color. The veins were normal in size and distribution, but the arteries were smaller than usual. The field of vision taken at the first examination showed a contraction to the 15° circle in both eyes.

When last seen, on March 5, 1932, the vision of the right eye was 20/200, unimproved with glasses. His total refractive error was +1.00 diopter. The disc was white, the edge irregularly depigmented, and the atrophic excavation deep. The caliber of both the arteries and the veins was somewhat reduced. A cilioretinal artery branched above and below the clear macula.

The vision of the left eye was 20/100 and yet the disc was white, with a very large, complete atrophic excavation. A small cilioretinal artery, which supplied the macular region, might account for the rather good vision. All the retinal vessels were narrow. A white sheath was especially visible along a portion of the inferior temporal artery where it passed over the disc edge.

There was a definite concentric contraction of the visual field, with an absolute central scotoma about 4 degrees in diameter.

The roentgenologic examination was made by Dr. I. J. Murnane, who reported: "Right lateral stereo: In the lateral view the sella turcica is well visualized; its anteroposterior diameter measures 13 mm., while the anteroposterior diameter of the skull measures 20 cm. The ratio is 1 to 15, which is within normal limits. The structure of the sella is negative. The processes are well outlined and of normal contour, and the other portions of the skull show no evidence of pathology."

C. M. G. (III 37), a married female, aged fifty-seven years, lost her sight suddenly, overnight, when she was twenty-one years of age. No constitutional or local symptoms preceded the failure of vision.

The vision of the right eye was 2/200. The white disc was small, with a shallow, complete central excavation. The arteries were straight and narrow. The veins were of normal caliber. The macula was clearly and distinctly outlined.

The vision of the left eye was 20/70. The small white disc showed a complete shallow excavation. The arteries followed a direct course; the veins were of normal width, and the macula was clear.

The fields showed marked peripheral contraction with an absolute central scotoma.

Roentgenologic findings: "The sella turcica measures 12 mm. in its anteroposterior diameter, representing one sixteenth of the corresponding diameter of skull. This is within normal limits. The sphenoid sinuses are unusually large. The sella is somewhat shallow and the posterior clinoid processes have a vertical position and are attenuated, with pointed ends, suggesting the possibility of intrasellar pressure. The structures of the skull are normal."

H. M. (III 38) was first seen on December 4, 1911, when he was twenty-eight years of age. He stated that four months before he had noticed that his sight was failing, but as he was not doing close work he found it difficult to determine how much vision he had lost.

The vision of the right eye was 2/200. The pupil measured 7.5 mm. and was regular, reacting very slowly to light. The media were clear. The disc was round; the veins were full and were slightly compressed where they were crossed by the arteries. There were no areas of exudate. The vision and the fundus of the left eye were the same as those of the right eye. He had a definite, complete central scotoma in each eye.

He was not seen again until February 29, 1932, at which time the vision of the right eye was 2/200; the pupil measured 3.5 mm. and was regular and active. The disc was clearly and sharply outlined by a fine, narrow, pigmented border. There was a shallow atrophic excavation, but the lamina cribrosa was not visible. As they passed over the disc the vessels appeared to be contracted, but this was an optical illusion. The arteries and veins were negative, although the branches of the arteries supplying the temporal side of the fundus were tortuous. The macula was clearly and distinctly outlined, but without change of color or of contour.

The left eye was negative externally, the vision 2/200. The pupil measured 3.5 mm., reacting promptly to light and accommodation. The edge of the white disc was distinct. The excavation was large and shallow. The lamina cribrosa was not visible. The vessels on the disc appeared to be attenuated. The arteries were straight; the veins broad, with several tortuous branches. The macula was clear and no lesion was apparent.

The field of vision showed a moderate concentric contraction with a large, positive central scotoma.

The x-ray examination disclosed the fact that the anteroposterior diameter of the sella turcica was 12 mm., one fifteenth of the corresponding diameter of the skull. The posterior clinoid processes were very prominent. The paranasal sinuses, especially the frontals, were definitely enlarged. There were no other abnormalities of the skull.

So far as we can determine, the patient has had no constitutional or infectious disease and, with the exception of his eyes, seems to be in perfect health.

B. M. (III 40) was not seen until he was fifty-four years of age. He gave a history of having lost his sight when he was thirty years of age, and, with the exception of a facial expression which gave a suggestion of acromegaly, but which was not borne out by enlargement of hands or feet, he seemed to be in excellent health. He gave no history of previous illness. He had not been susceptible to colds, nasal infections, or headaches. The patient was subnormal mentally.

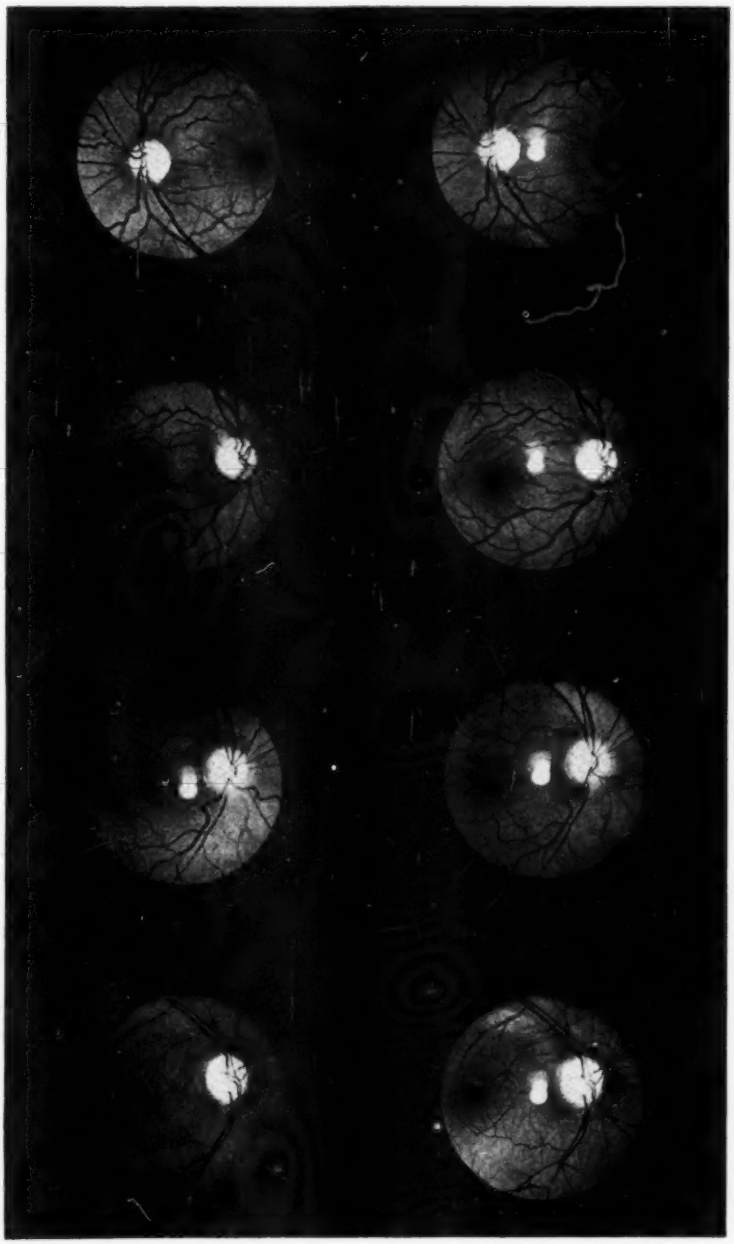

Fig. 4 (Bedell). Stereoscopic photographs of the fundi.
(a) H. M., left eye.
(b) H. M., right eye.
(c) B. M., right eye.
(d) E. M., right eye.

On February 27, 1933, the vision of the right eye was 5/200. The pupil measured 3 mm. and was regular and active. The media were clear; the disc was white, with an atrophic temporal excavation and a narrow conus with an irregularly pigmented border. The vessels on the disc appeared to be narrow, but as soon as they passed beyond the edge they became wider. There were comparatively few venous branches. The arteries

which passed directly over the fundus were small, their walls presenting no visible changes. The macular region was clear. The entire retina was thin, so that the underlying choroid could be dimly discerned.

The vision of the left eye was 2/200. The disc was pale, with a large, deep atrophic excavation; the lamina cribrosa was not visible. The arteries were smaller than in the right eye, and there were few branches from either veins or arteries; the arteries extending to the clear macula were corkscrewlike in course. There were three isolated areas of choroidal pigment on the temporal side.

The field of vision of the right eye showed a small island of retained perception in the inferior nasal sector. The left was concentrically contracted, with an absolute central scotoma.

X-ray report: The anteroposterior diameter of the sella turcica was 14 mm., representing one thirteenth of the corresponding diameter of the skull. These relations were within normal limits. The posterior clinoid processes were unusually prominent, and showed definite erosion on the posterior surfaces, with marked pointing and forward deflection in their tips. The root of the sella turcica was completely bridged—not by the approximation of the tips of the clinoid processes, but apparently by a thickened diaphragm of the sella. The paranasal sinuses were very prominent, especially the unusually wide ethmoid and sphenoid cells.

Mrs. G. M. C. (III 43) has up to this time escaped the family trouble. When examined on March 24, 1932, at the age of fifty, vision in the right eye was 20/200, which, with a correcting glass for far-sightedness and astigmatism, was brought to 20/20+, and Jaeger 1. The pupil measured 3 mm. and was regular and active; the media were clear. The disc was oval, with a small central excavation, and on the nasal side an overlying lip of nerve fibers. The arteries were normal in course and size. The macula was clear and distinct. The field of vision was normal.

The vision of the left eye was 20/200, corrected to 20/20+. The disc was oval, with a small central excavation, a narrow scleral ring, and a pigmented border. The arteries and veins were full but normal. The macula was clear. The field of vision was negative.

On x-ray examination the sella turcica, which measured approximately 12 mm.—a ratio of one to fifteen with the anteroposterior diameter of the skull—could not be posed in a true lateral position, but its outline was fairly well demonstrated. The anterior clinoid processes were normal. The posterior clinoid processes appeared to be deflected into an abnormally vertical position and were somewhat thin, with pointed tips. These findings were considered compatible with increased sellar pressure. The accessory nasal sinuses, especially the sphenoids, were quite large. Otherwise the bony structure throughout the skull was negative.

P. A. (III 52), a son of a maternal descendant of the "B" family (II, 14), was first seen on March 28, 1912, when he was twenty years of age. He stated that six weeks ago he could see well. After an evening spent in reading, he discovered, on arising the following morning, that his vision was decidedly poor and it has remained so ever since.

The vision of the right eye was 2/200. The pupil measured 4.5 mm., was regular, and reacted sluggishly to light. The disc edge was clearly outlined. The temporal segment was glistening white, the lamina cribrosa invisible. The vessels were unchanged in size or distribution. The vision of the left eye consisted of perception of light. The disc was white, and the blood vessels retained their normal size.

When last seen, on April 23, 1932, the vision in the right eye was 2/200. The pupil measured 3 mm., was regular and active. At that time the disc of the right eye was white, with a large atrophic excavation; the lamina cribrosa was invisible. The vessels in the upper half of the fundus were practically of normal size. The inferior arteries were decidedly contracted for a distance of at least one-and-one-half disc diameters beyond the lower edge of the disc, where they resumed their normal caliber. The paralleling vein was partially obscured in a portion of its course. The nasal artery indented the vein, and both vein and artery in this region were slightly obscured by the overlying retina. The macula was clear and distinct, without vascular or pigment changes.

The vision of the left eye was 1/200. The pupil measured 3 mm., was regular and active. The disc was chalky white, with a narrow pigmented arc on the temporal side and a small cilioretinal artery extending to the macula. The perivascular markings were distinct along the narrow but patent arteries, and in some places about the otherwise normal veins. There were no areas of depigmentation or change in the remaining portions of the fundus.

The fields of vision showed an irregular contraction, especially in the nasal portions, with a large, complete central scotoma.

X-ray examination: The anteroposterior diameter of the sella turcica was 14 mm., which measurement was one fifteenth of the corresponding diameter of the skull and, therefore, within normal limits. The contour of the sella was negative. The clinoid processes were well outlined and were of normal consistency. In general, the bony structure of the skull was negative except for the sinuses —especially the sphenoids—which were unusually large.

T. G. (IV 24), son of C. M. G., when nineteen years of age suddenly lost his sight. For about three days he was unable even to see around a room, but at the end of two weeks he had recovered sufficiently to be able to do gross work. He remembers that for two or three weeks after the beginning of his illness he had an intense headache, which seemed to be generalized and constant. He also recalls that the vision of the left eye returned more slowly than that of the right.

On March 26, 1932, when he was thirty-

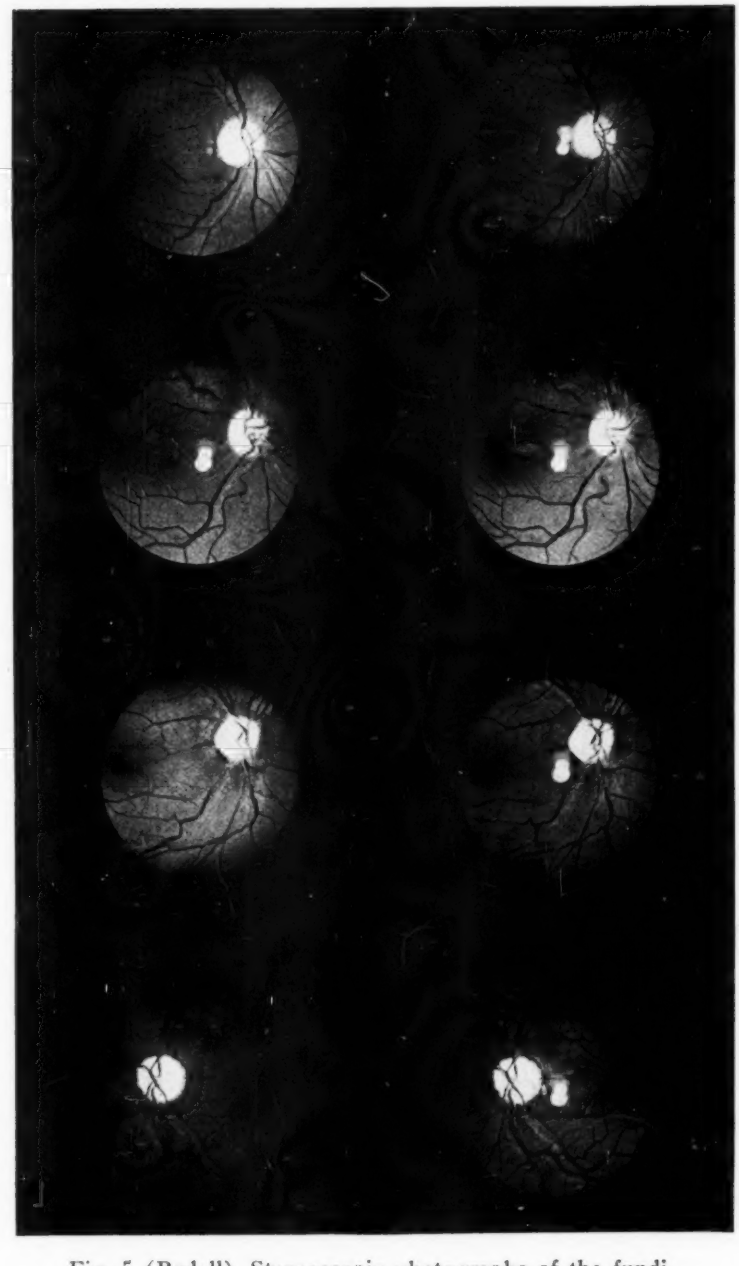

Fig. 5 (Bedell). Stereoscopic photographs of the fundi.
(a) C. M. G., right eye.
(b) T. G., right eye.
(c) P. A., right eye.
(d) P. A., left eye.

four years of age, the vision of the right eye was 3/200. The pupil measured 3 mm., was regular and active; the media were clear. The disc was white, but a little more than half of the nasal side was vascular and prominent, with a round, projecting portion over which the vessels curved into the atrophic excavation. This overhanging part consisted mainly of blood vessels which obscured the disc edge. The veins were normal in size and in distribution. The arteries showed an increased visibility of the wall as well as some

thickening of the perivascular sheath and an increased tortuosity in the major temporal branch. The macula was clear, and the color of the remaining portion of the fundus was normal.

The vision of the left eye was 1/200. The pupil measured 3 mm., was regular and active. The disc was white and sharply outlined; the large atrophic excavation was partly filled with white connective tissue. The inferior vessels were distinctly sheathed by a thickened perivascular layer. There were numerous vessel branches in the upper half of the retina.

The field of vision showed a concentric contraction with a definite absolute central scotoma, which was vertically oval in the right and almost round in the left eye.

X-ray report: The sella turcica measured 12 mm. in its anteroposterior diameter. This was one sixteenth of the corresponding diameter of the skull, and was within physiologic limits. The general contour of the sella was normal; the anterior clinoid processes were negative. The posterior clinoids were somewhat long and attenuated, without exhibiting any definite evidence of destruction. There were no signs indicative of increased intracranial pressure.

So far as we know, no pathologic examination of a patient suffering with Leber's disease has been reported except Rehsteiner's. We have presented the pedigree of five generations, from three separate parent stocks, so that all who come in contact with the families may, if the opportunity presents itself, make an exhaustive study of the early symptoms, the fundi, including stereoscopic photographs, the fields, systemic changes, and radiographic appearances.

Some members of these families have been under observation since 1909. The radiographs and fields taken at that time have been compared with the present findings. In addition to the older recording methods, stereoscopic photographs of the fundus and colored photographs are included in this report. The patients are free from syphilis and there has been no consanguinity.

Our investigations have shown that, from the fountains of our supply, represented by five generations from three separate stocks, we can positively trace the disease to an affected woman of the "B" family; that the "M" and "A" groups were unaffected until they married into a strain from "B," and, further, that no member of "M" or "A" acquired the disease if they were unmarried or if they were born before the period of "B" contamination. The pedigree shows this inheritance.

In the first generation of the "M" family illustrated in Chart I, 1 married 2, and from that union there were 7 children—two females (II 2 and II 4) who married, and from their unions it is found that none of their children (III 1 to 26) had optic-nerve lesions; the grandchildren (IV 1 to 21) were likewise free, and the single descendant in V 1, who is still a child, shows no tendency to this disease.

There were five males: II 5, who died when he was twenty-one years of age; II 6 and II 7, who died in infancy; II 8, who married and had six children (III 26 to 32), four males and two females, who are living and unmarried.

When we return to line I, we find that of the "B" family three married into the V. H. family I 4, and from that union there were three children: two females (II 11 and II 14) and one male (II 12) who did not marry. It is quite essential that at this point attention should be called to the fact that I 4 showed optic atrophy, and II 12, the unmarried son, also exhibited optic atrophy. The two daughters from this "B" family were free from the disease. One of the "M" family (II 10) married one of the daughters of the "B" family (II 11); and from that union there were three females and five males.

III 33 is afflicted with the disease. She married but had no children.

III 37 also has the disease. She married and had five children, three of whom died in infancy and one, a male (IV 24) has the disease. He is thirty-four years of age and although married, has no children.

III 43, the third female, is unaffected. She married but had no children.

III 34, an unmarried male, had Leber's disease. He died at the age of twenty-eight.

III 35, aged thirty-seven years, has the disease but is unmarried.

III 38, male, fifty years of age, has the disease. He is married but has no descendants.

III 40 has optic atrophy. He is fifty-

four years of age, is married, but has no children.

III 44, the last male member of this group, has the disease. He is married and has five children, one of whom (IV 29) is married and has one unaffected child.

IV 30, male, is free from the disease. He is married and has one unaffected child.

IV 32, male, aged eighteen years, IV 33, aged twelve years, IV 34, male, aged ten years are unaffected.

Both the father and the mother of the third family group traced through generations I and II were unaffected.

II 14 was a female member of the "B" family, who married II 13, a member of the "A" family; from that union there were four males and two females.

III 47, a female, is married and has five children, two females and three males, all of whom are unaffected at this time.

III 51, a married female, is unaffected and has no children.

III 48, a male, is free from the disease, and although married, has no children.

III 54 is a married male. He has two boys, who are unaffected and unmarried.

III 56 is an unmarried male.

The disease became evident in III 52 when he was twenty years of age. He has married, but fortunately has no descendants. The detailed history of each case is included in the paper.

The fields were taken with the Ferree-Rand perimeter. The roentgenologic examinations were made by Dr. I. G. Murnane, Radiologist to St. Peter's Hospital.

A critical analysis of the cases reveals that certain findings are common to all:

1. The disc is sharply and clearly outlined.

2. There is a definite loss of substance, resulting in an atrophic cup.

3. The arteries are somewhat attenuated, but present nothing characteristic either in their course or in their contour.

4. The loss of vision is sudden, usually within a few hours, and most often occurs overnight, generally affecting both eyes, but, sometimes, to an unequal degree.

5. Slight improvement occurs shortly after the onset and then for years there is practically no change.

Several authors have advanced the theory that the condition is caused by pressure upon the sellar region. Their contention has not been proved, and the evidence from this series of cases would seem to oppose their theory. It is of interest to note that one of the patients who was free from this disease exhibited the most marked change in the pituitary region.

It is well known that the variations in the shape of the sella turcica and of the clinoid processes are so numerous that it is impossible to place much reliance on them either as a guide to intrasellar changes or as to sudden pressure on the optic nerves or chiasm. The large sphenoids may suggest a possible source of an acute toxic neuritis, but in our cases there was neither antecedent nor persistent infection of these sphenoids and there was no local sinus disease. Furthermore, there was no evidence that the patients had been exposed to the common causes of retrobulbar neuritis, such as alcohol, tobacco, or local nerve poisons. No signs of multiple sclerosis were evident, so that our most thorough investigations have failed to disclose the reason for the sudden blindness, which is associated with age and family in such a way as to prove most perplexing.

Many theories have been propounded to explain the disease, and there are a great many cases included in the literature of the subject that are not strictly Leber's atrophy. It is wise to segregate the real cases of hereditary optic atrophy from those which have been placed erroneously in the group. The fact that several members of a family become partially or totally blind does not justify a diagnosis of hereditary optic atrophy. A perusal of the literature will explain the necessity for using discrimination.

That this disease is an optic atrophy and is not, as some have believed, a central retinitis, can easily be proved by

the inspection of the fundus photographs.

Conclusion: Leber's disease is essentially a familial atrophy of the optic nerve.

344 State Street.

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Bruner. Amer. Ophth. Soc., 1912, v. 13, pt. 1, p. 162.
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Discussion. Dr. John Green, St. Louis: I have recently had the privilege of reading an interesting paper on Leber's disease (as yet unpublished), by Dr. Cordes, of San Francisco. I was struck by the fact that in two of his patients who presented moderate contraction of the peripheral field there was relatively good vision. This was accounted for by the fact that the central scotoma was only partial.

May I inquire whether all of Dr. Bedell's patients presented complete central scotomas?

Dr. W. H. Wilmer, Baltimore: I have seen a number of cases of Leber's disease, but I have never seen one in a female. In my experience the usual history is that first one eye becomes involved—sometimes rather suddenly—and then the condition slowly develops in the other eye. Of course, this disease must be differentiated from retrobulbar neuritis, axial neuritis in disseminated sclerosis, and others.

In regard to treatment, when these patients come for consultation they feel that they have nothing to hope for, and hence are much discouraged. When I have assured myself that it is a case of true familial optic atrophy, I frankly say to them and to the family: "I do not think you will ever be well, but I feel sure that you will never be blind. While I do not think you will improve materially, I am absolutely sure that at thirty you will be much better than you are now, by accustoming yourself to the central blind spot." It is curious to note the change in the psychology of these patients. They are greatly helped by this frankness. When I have made a diagnosis of hereditary optic atrophy in young people, I have no difficulty in getting them to come back to my teaching clinics. They always say that they feel better.

I have recently seen two boys in the same family. One has a white optic nerve, such as Dr. Bedell has illustrated, without much cupping. In the other brother the optic cup was originally most pronounced, but now the excavation is so extensive that it simulates a glaucomatous cup.

Dr. Robert Scott Lamb, Washington, D.C.: It might be interesting for Dr. Bedell to follow these cases and determine by an x-ray picture of the optic foramina the presence of any abnormal condition.

Dr. T. B. Holloway, Philadelphia: During the past year it has been my privilege to study a family in which Leber's disease ran through four generations, comprising 43 members, three of whom were examined.

The most interesting contribution to this subject is that to which Dr. Bedell alluded, that of Julia Bell. She pointed out that this disease, in a majority of instances, reached its height within two months after its onset. This was far from true of one of the patients in the pedigree I refer to. Julia Bell also cited statistics for various field manifestations. In regard to prognosis, her studies indicated that the final result was better in those cases that developed prior to the age of sixteen.

The most interesting patient in my pedigree was sent to the University Hospital on Dr. Frazier's service for impairment of the anterior visual pathway. There were no signs of increased intracranial tension. Later the patient was transferred to my service. The height of the disease was not attained until nine months after the date of onset. This patient was doubtless ignorant of any possible hereditary taint, for he repeatedly denied knowledge of any other case in his family. Eighteen months after he became affected his younger brother developed evidences of the same condition. The elder brother then became interested and subsequently furnished considerable data relating to the family. It is interesting to note that there are eight children younger than the second brother affected.

Dr. Arthur J. Bedell, closing: I am of the opinion that Dr. Shannon's case was not one of Leber's disease. In the light of our present knowledge, I believe that multiple sclerosis was the cause of the condition.

In answer to Dr. Green's question, all the patients that I have seen have had an absolute scotoma.

Dr. Wilmer has the happy faculty of making a psychologic appeal to these patients. I do not know whether we could do this up in the country, where we have to live with them, and not just see them on rare occasions.

In answer to Dr. Lamb's question, the optic foramina were thoroughly studied in these cases.

I am glad that Dr. Holloway emphasized

the question of onset. This is a most important point in differentiating this disease from some other conditions.

In closing, I present a case of Leber's disease on which syphilis was engrafted. The patient, C. N., was seen twenty years ago, when he was eighteen years old, because of blurred vision. It was impossible to secure any very clear history from the boy, but by questioning other members of the family it was learned that his sight had failed gradually and that in a few weeks he had reached his present condition of almost complete blindness. His pupils were active; the media were clear; the discs were white, the arteries and veins were of fairly normal caliber. The general examination, including the x-ray and Wassermann, was negative. The last examination was made May 18, 1933, when the patient was thirty-eight years old. The vision of the right eye was hand movement. The pupil measured 4 mm., was regular and reacted slowly but positively to light stimulus. The media were clear; the disc was white, with well-defined margin, and two irregular, contiguous, pigmented choroidal spots. The arteries and veins were of normal size and distribution. The vision of the left eye equaled hand motion. The pupil measured 4 mm., was regular, and reacted slowly to light. The media were clear. The disc was white and sharply outlined. The retinal vessels were slightly smaller than normal. The vision was so poor and the mental capacity so limited that it was impossible to take the fields.

The only lesions discovered in the patient's father, who was sixty-two years of age, were an immature cataract in the right eye and a mature one in the left. He died eighteen years later. The patient's mother was examined when she was fifty-five years of age, and was found to have a bilateral optic atrophy with vision equal to the perception of hand motion. She had lost her eyesight rapidly—within a few days—early in life. As she was an abandoned orphan, it was impossible to trace her history. One sister of C. N., thirty-one years old, is married, but she has no children, and, so far as we can determine, she is free from disease of the optic nerve. A brother, forty-five years old has what the patient terms fair vision. Another brother, forty-two years of age, has optic atrophy. The third brother thirty-two years of age, is still able to read.

This fragmentary history, combined with the physical examination of the patient shortly after the onset of the optic-nerve lesion, warrants the diagnosis of hereditary optic atrophy. The case is presented to emphasize the necessity of making a careful investigation before regarding primary optic atrophy as necessarily syphilitic in origin. The patient contracted syphilis eight years ago, and since then has been receiving active treatment directed toward the improvement of his ocular lesion. His physician did not appreciate that he was dealing with a disease which antedated, by many years, the specific infection.

UNIOCULAR CONJUNCTIVITIS FROM PEAT DUST

BARTON J. POWELL, JR., M.D.
STOCKTON, CALIFORNIA

Only one eye was involved in over one hundred cases of an intensely painful, although quite superficial inflammation. It occurred in a region subject to the irritating action of peat dust of a strongly acid nature combined with sharp spicules of silicon. Darker-skinned field workers were less frequently affected than Caucasians. Read before the California State Medical Society at Del Monte, in May, 1933.

I propose to present for your consideration a most singular type of conjunctivitis prevalent in my community during the dry season, which extends from April to October. I can find no mention of it in the literature and as far as I can ascertain it has not been seen, or at least recognized, outside of a comparatively small area.

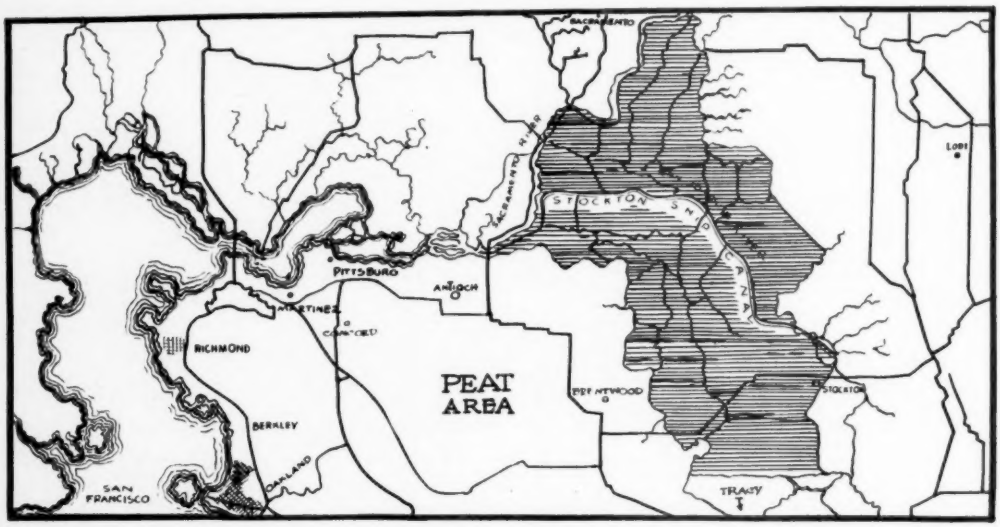

Fig. 1 (Powell). Map showing peat area (shaded).

This district, as shown on the map, is an area of some 150,000 acres lying directly west of Stockton, which is locally known as the San Joaquin River Delta. The entire area was at one time a large swamp unfit for agricultural purposes. During the past fifty years this section has been reclaimed. Large levees were placed around all of the islands thus formed, leaving the earth's surface below the river land. Before this huge swamp was conquered, tules and swamp grass flourished. Each year this vegetation as it died off formed a deeper and deeper layer of peat soil, which now makes up one of the most fertile agricultural regions of the world.

Practically all of this soil is acid in reaction and varies from pH_4 to pH_7. It consists essentially of the partly decomposed residue of certain types of marsh plants, containing also considerable quantities of common salts. These occur in variable proportions and consist of nitrates, sulphates, and chlorides of calcium, magnesium, and sodium. Probably all of the dried particles, which are themselves chemically inert, are either impregnated with these salts or carry them on their surface. Microscopically many silica spicules characteristic of the skeleton of certain fresh water and brackish water sponges are present. These exceedingly small, sharp, spindlelike silica particles vary in length from 50 to 300 microns. They are very hard and greatly resemble minute chips of glass. When the soil is thoroughly dried it forms a very fine irritat-

ing dust, which, on a windy day, darkens the atmosphere. Peat also burns in large areas, often smoldering to a depth of several feet for many days at a time. Practically the entire area has been burned at one time or another, leaving a very fine ash intermixed with the soil.

There is a prevailing west wind which, during the spring and autumn months, is constant and often of high velocity. The farm products raised in this region are essentially the same as those to the north and south of Stockton. Methods of cultivation and harvesting are identical. Also the same type of farm help is employed, and their mode of living is the same as is that in other parts of the country. In fact, everything is similar except the type of soil.

The inhabitants of this district have long been aware of the irritating nature of the peat dust. It causes severe skin irritation, especially on the legs of light-complexioned people when first exposed to it. It appears that immunity is built up after prolonged contact. Rubbing or scratching the infected areas will produce blisters and multiple hemorrhagic points. Skin irritation in dark-complexioned whites and in the Orientals is not so common, but does occur. The eruption clears up readily when the cause is removed and with the application of any soothing lotion or ointment.

Some time ago, during a particularly hot, dry, and windy season, two or three patients a day with painful conjunctivitis presented themselves to me for relief. This was readily attained by the use of cocaine and homatropine instillations combined with the use of silver-protein salts. A majority of the patients had complete relief after twenty-four hours, and were discharged after the second office call. The cause of this large number of cases of conjunctivitis aroused my curiosity and I soon found that all of the cases seen originated here in the Delta. Combining the facts that peat dust was a known irritant and that there was a great deal of it in the atmosphere at this particular time, I surmised that this must be the causative agent. From that time, August, 1931, I have kept a very accurate history of each case seen, and was astounded to find that everyone originated in the Delta region.

The inflammation of the conjunctiva of the affected eye is characterized by hyperemia, profuse lacrimation, intense pain and photophobia. Conjunctival injection and ciliary injection are both present and the inner surface of the eyelid has a meaty appearance. Sometimes numerous small, grayish, raised papules are seen throughout the palpebral conjunctiva. Lacrimation is always profuse and the subsequent epiphoria induces a burning sensation in the surrounding skin and nasal mucosa. A thin purulent exudate is usually present; however, there is usually no visible pus. Pain is always very severe and is of a burning nature. There is intensive itching and patients often complain that their entire eye is throbbing. Unless relief is obtained within a few hours, a frontal headache usually develops. The eye is so sentitive to light that it is often voluntarily covered by the patient. The cornea is rarely involved unless direct trauma has occurred, when ulcerations are present. The other media of the eye are clear. In the more severe cases there is a slight spasm of the iris causing a contracted and irregular pupil. However, the iris muscle responds readily to mydriatics unless corneal ulceration is present. Occasionally a slight congestion of the retina may be observed. There is usually a mild hyperemia of the conjunctiva of the opposite eye, but other symptoms are seldom present. When there is any pain or lacrimation in this eye, the severity is extremely mild, especially in comparison with the affected eye.

A composite history is that while at work in the field, a sudden heavy dust-laden gust of wind struck the patient full in the face when his eyes were open. Almost immediately there was severe burning irritation of both eyes, one eye more severe than the other. There was a sensation of sand in the eyes and the person invariably tried to rub it out, often with a dirty handkerchief or sleeve. Painful photophobia and lacrimation rapidly developed and the laborer quit his work to seek aid. Due

to the inadequate transportation available to the poorer class, I did not see many of these until twelve or thirty-six hours afterwards. During this period these people suffered intense pain and were unable to sleep. Boric acid solution, argyrol, hot packs and other home remedies apparently gave little relief. These people invariably stated that they had rubbed the affected eye quite vigorously. The rubbing produced transient relief, but the pain was more severe a few minutes afterward. A few of them stated that they had rubbed both eyes equally, but one eye appeared to get better and the other gradually became worse.

A résumé of the history of the last one hundred and five cases shows that the right eye was involved in fifty-six, the left in forty-nine. In the fifty-six cases in which the right eye was affected, three of these people were left handed; in the forty-nine cases involving the left eye only one was distinctly left handed in his actions. Nine of this series were wearing glasses at the time, and three had so-called dust-proof goggles. Although 95 percent of the workers in this district are Mexicans or Orientals, only 45 percent of the cases seen were in the darker-skinned races. It appears then that this group of people is not only less susceptible to the skin irritation but also their conjunctivae are more resistant. I also inquired as to whether they had had any previous eye infections, and found that several had had corneal ulcerations and ocular foreign bodies, but these had been in the unaffected eye as often as in the injured one. In a small series of retinoscopies it was soon apparent that the refractive error played no part.

Bacteriological tests usually demonstrated a predominance of staphylococci, with occasional cases in which the Morax-Axenfeld bacilli were found. In several of the slides no bacteria were seen. Similar organisms were also found in the unaffected eye, but of course were not nearly so numerous. The lacrimal fluid of both eyes was alkaline at the time of examination. I believe that this is purely an irritative conjunctivitis due to the strong chemical action of the acid salts of the soil combined with a mechanical erosion of the conjunctival epithelium from rubbing in the sharp silica spicules. The bacteria found are of the normal flora and virulence. They have numerically increased due to the severe irritation. The rapid response to superficial medication shows that there cannot be a very severe bacteriological infection in the deeper layers of the conjunctivae. I am at a loss to explain why in all the cases I have seen so far the infection has been unilateral.

Summary. This type of conjunctivitis is due to irritation from acid salts and silica spicules found in peat dust. It is mechanically aggravated by rubbing. A dry, windy climate is necessary. The essential point in treatment is to allay the spasm of the iris. It is always uniocular.

I wish to thank Professor Charles F. Shaw and John S. Burd of the University of California College of Agriculture for their willing coöperation in furnishing data on the chemical and physical properties of peat soil.

242 North Sutter Street.

ENOPHTHALMOS IN HORNER'S SYNDROME

HENRY P. WAGENER, M.D.
ROCHESTER, MINNESOTA

Exophthalmometer readings in 94 cases of Horner's syndrome demonstrated enophthalmos in only one instance. However, a comparison of averages in these cases with those from two groups of a like number of normal subjects indicated a tendency to enophthalmos in those affected with Horner's syndrome. The author considers this to be due to shrinkage of the orbital tissue, not to relaxation of the smooth muscles of the lids and orbits. From the Section on Ophthalmology, The Mayo Clinic. Read before the American Ophthalmological Society, in Washington, D.C., May 8-10, 1933.

Of the three accepted ocular signs of Horner's syndrome, ptosis, miosis, and enophthalmos, enophthalmos is the least definite. Opinions vary as to its constancy. Scarlett, in his report of sixteen cases, stated that enophthalmos was present in every case. On the other hand, in a report of seventeen cases, Couzen stated that ptosis and miosis were present in sixteen but that enophthalmos was less constant. It is Uhthoff's belief that after long-standing paresis of the cervical sympathetic nerve there is slight enophthalmos of the affected globe. In the discussion of Scarlett's paper, Weidler reported a left Horner's syndrome of two years' duration due to injury of the brachial plexus. Enophthalmos was not present.

Clinically, it is difficult to be sure of the presence of a low degree of enophthalmos or exophthalmos by observation only. Narrowing of the palpebral fissures will cause apparent enophthalmos, and widening of the fissures apparent exophthalmos. A single exophthalmometer reading also is of little value because of the wide variations among normal persons. Thus, in a series of 200 presumably normal subjects measured with the Hertel exophthalmometer, although 80 percent of the readings fell between 15 and 20, individual eyes measured as low as 11 and as high as 24. In the absence of previous measurements, it cannot be stated definitely that an eye is enophthalmic simply because the exophthalmometer reading is lower than 15, or that it is exophthalmic because the reading is higher than 20. Probably readings lower than 11 can be safely considered to indicate enophthalmos and readings higher than 24, exophthalmos. In deciding on the presence of unilateral enophthalmos or exophthalmos, the orbital asymmetry of normal persons must also be taken into account. In 50 of my series of 200 normal subjects, the exophthalmometer readings were the same for both eyes, whereas in 150 clinical cases the position of the two eyes varied from 0.5 to 2 mm. A difference of 2 mm. was present between the two eyes of 43 subjects. It seems, therefore, that a difference greater than 2 mm. should be present before one eye is considered to be enophthalmic or exophthalmic on the basis of a single exophthalmometer reading. It is of interest in this series that the reading for the left eye was higher in 139 cases and for the right eye in only 11. This was probably determined by an individual variation in the exophthalmometer or in the method of reading.

The mechanism of the enophthalmos in Horner's syndrome has never been quite satisfactorily explained. Von Michel stated that the enophthalmos is explained partly by a paralysis of the smooth orbital muscle and partly by a decrease of the fat of the orbit, caused through trophic influences. Cobb and Scarlett stated: "As the smooth muscles of the eyeball are normally in tonic contraction, they keep the globe forward and the lids separated. Cessation of this function is followed by ptosis, narrowing of the palpebral fissures, and enophthalmos." The failure of operations on the cervical sympathetic ganglia to reduce the exophthalmos in exophthalmic goiter in spite of definite narrowing of the palpebral fissures has made it doubtful whether the state of tonicity of the smooth muscles of the orbit has much influence on the position of the eyeball in the orbit. In lower animals, the orbital muscle has a very definite function

in keeping the orbital wall tense and in protruding the globe. According to Whitnall, however, this muscle is purely vestigial in man, and excitation of the cervical sympathetic nerve does not cause protrusion of the globe. It seems probable, therefore, that enophthalmos would occur in paralysis of the cervical sympathetic nerve only after a certain amount of shrinkage or atrophy of the orbital contents had occurred due to loss of the trophic influence supplied by this nerve, according to Whitnall.

In the experiments of François-Pourfour du Petit and of Claude Bernard (quoted by Fulton), section of the trunk of the vagosympathetic and of the cervical sympathetic nerve in dogs produced immediate retraction of the eyeball into the orbit. That similar immediate enophthalmos does not occur, as a rule, in man was shown by my studies on the eyes of patients on whom cervicothoracic sympathetic ganglionectomy had been performed for the relief of Raynaud's disease and other allied vasomotor disturbances of the upper extremities. Preoperative and postoperative exophthalmometer readings were made in twenty-seven cases. In each instance, the postoperative readings were made without reference to the preoperative records. The readings were the same or 1 mm. higher in one or both eyes in nineteen cases. For some unexplained reason, the readings were 3 mm. higher in both eyes of one patient. The postoperative readings were 1 mm. lower in both eyes of one patient on whom the operation was performed on one side only, and they were 1 mm. lower in one eye of three patients. The operation had no effect on the size of the pupils and palpebral fissures of three of these patients. Three patients were observed to have "possible" enophthalmos. One of these, five months after operation, had a reading of 2 mm. lower for the right eye. The narrowing of the pupils and fissures was also more marked in the right eye. Another patient had a postoperative reading of 1 mm. lower on the right side and 2 mm. on the left; the narrowing of the pupils and fissures was more marked on the left. The third patient had postoperative readings of 2 mm. lower on the right side, and 1 mm. lower on the left, and there was marked narrowing of the palpebral fissures but no miosis. It is possible that the variations in the readings in these cases fall within the limits of error in making the measurements. At least, it can safely be said that enophthalmos will not occur in more than 10 percent of cases as an immediate result of section of the cervical and thoracic sympathetic trunks. No change had occurred in the exophthalmometer readings nine months after operation in two cases and thirteen months after operation in one case (table 1).

Table 1

EXOPHTHALMOMETER READINGS IN TWENTY-SEVEN CASES OF CERVICOTHORACIC SYMPATHETIC GANGLIONECTOMY

Cases	Postoperative findings
11	No change
9	1 mm. higher (one or both eyes)
4	1 mm. lower (one or both eyes)
3	2 mm. lower (one eye)

Ninety-four clinical cases of Horner's syndrome were studied with special reference to the presence of enophthalmos. The right eye was involved in 47 cases, and the left in 47. In each case, failure of cocaine to dilate the pupil on the affected side was used as the test of the actual presence of a paralytic lesion of the cervical sympathetic nerve. The causes of the lesions were varied. The most frequent cause was pressure from nodes or tumors in the cervical region, which were present in 36 cases. In 19 of these cases a large adenomatous thyroid gland, usually larger on the side of Horner's syndrome, was presumably at fault. Horner's syndrome followed injury to the brachial plexus in ten cases, was presumably congenital in five, and was associated with migraine in five and with deformities of the cervical and thoracic spine in three. Other causes were found mainly in individual cases. Among the diagnoses were: syringomyelia in one case; cord tumor in one; traumatic myelitis of cervical and dorsal cord in two cases; multiple sclerosis in

two; encephalitis in three; carcinoma of the lung in one case; aneurysm of the arch of the aorta in three cases, and sarcoma of the wall of the thorax in one case. No adequate cause for the lesion could be found in 21 cases. In most cases, it was not possible to learn how long Horner's syndrome had been present. In a few cases, however, a fairly definite history of the time of onset was obtained.

A brief survey of the exophthalmometer readings in this series of cases makes it seem doubtful that enophthalmos is by any means a constant symptom of Horner's syndrome; for, although a lower reading was obtained for the eye on the affected side than for the other eye in 36 cases, the reading was the same for both eyes in 34 cases, and was higher on the affected side in 24. In order to evaluate more correctly the meaning of these data, exophthalmometer readings were taken for comparison in two separate series of 100 apparently normal subjects. The comparative data are presented in tables 2 and 3. The upper and lower limits of exophthalmometer measurements in the series with Horner's syndrome were the same as in the series of normal subjects, that is, 11 and 24. If we accept a difference of 0.5 to 2 mm. in the position of the eyes as within normal limits, definite enophthalmos could be demonstrated in only one case of right Horner's syndrome in which the readings were 13 in the right eye and 17 in the left eye. It is of interest to note, however, that, in the series of normal subjects, there was no instance in which the reading for the left eye was 2 mm. lower than that for the right. In two cases of left-sided Horner's syndrome, the reading of the left eye was 2 mm. lower than that of the right. These eyes would probably have to be considered as enophthalmic.

In the first series of 100 normal subjects, the average readings were found to be 17.6 for the right eye and 18.2 for the left eye. In the second series of 100 subjects, the average readings were 17.5 for the right eye and 18.5 for the left eye. In the series of ninety-four cases of Horner's syndrome, the average readings were 16.8 for the right eye and 17.4 for the left eye. These figures would seem to indicate an average of 1 mm. of enophthalmos in the cases of Horner's syndrome. That this is not actually so is shown by the fact that the average reading of the right eye was 16.91 in forty-seven cases of left Horner's syndrome, and 16.76 in forty-seven cases of right Horner's syndrome, and the average reading of the left eye was 17.63 in forty-seven cases of right Horner's syndrome, and 17.25 in forty-seven cases of left Horner's syndrome, a difference of less than 0.5 mm. in each case (table 2).

However, a more critical comparison of the data seems to suggest a certain

Table 2

EXOPHTHALMOMETER READINGS

Cases	Diagnosis	Average		Comparative			
		Right eye	Left eye	Same measurements	Right eye 0.5 to 2 mm. lower	Right eye 0.5 to 2 mm. higher	Right eye more than 2 mm. lower
100	Normal	17.6	18.2	34	56	10	0
100	Normal	17.5	18.5	16	82	1	1
94	Horner's syndrome	16.8	17.4	34	52	7	1
47	Right Horner's syndrome	16.7	17.6	12	31	3	1
47	Left Horner's syndrome	16.9	17.2	22	21	4	

tendency to enophthalmos in cases of Horner's syndrome, although this enophthalmos is difficult to demonstrate in individual cases and must, in most cases, be very slight. Thus, in table 2, it may be noted that, although the number of cases in the Horner's-syndrome group in which both eyes measured the same, closely approximated the number in the normal group, the majority of identical measurements falls into the left-sided Horner's syndrome. In the same way the majority of the lower measurements of the right eyes falls into the right-sided Horner's syndrome. Also, in table 3 it may be noted that the reading for the right eye was 2 mm. lower than that for the left eye in ten of forty-seven cases of right Horner's syndrome and in only one of forty-seven cases of left Horner's syndrome. In table 3, it may be noted that the reading for the left eye was 2 mm. lower than that for the right in two of forty-seven cases of left Horner's syndrome, and in none of forty-seven cases of right Horner's syndrome. Nevertheless, it seems justifiable to state that enophthalmos could be definitely demonstrated in only one of ninety-four cases and questionably in two others.

It seems safe to assume from observations in cases of cervicothoracic sympathetic ganglionectomy that paralysis of the smooth muscles of the orbit and eyelids does not have any immediate or appreciable effect on the position of the eyeball in the orbit. If loss of the trophic influence to the tissues of the orbit as a result of paralysis of the cervical sympathetic nerve will cause atrophy or shrinking of these tissues and consequent enophthalmos, then it might be expected that enophthalmos would be more marked in the cases of longer duration. However, this is only partially the case. The one case of right-sided Horner's syndrome, in which the right eye was 4 mm. lower than the left, was of twenty-three years' duration. A case of left-sided Horner's syndrome, in which the left eye was 2 mm. lower than the right, was of congenital origin; the other, however, followed injury of the brachial plexus ten months before observation. In one case of left-sided Horner's syndrome associated with an adenomatous goiter, the right eye meas-

Table 3

EXOPHTHALMOMETER READINGS

Cases	Diagnosis	0.5 mm.	1 mm.	2 mm.	3 mm.	4 mm.	Total
			Right eye lower				
50*	Normal	3	21	11	1	0	36
47*	Horner's syndrome	4	16	5	0	1	26
47	Right Horner's syndrome	4	17	10	0	1	32
47	Left Horner's syndrome	5	15	1	0	0	21
			Left eye lower				
50*	Normal	1	2	0	0	0	3
47*	Horner's syndrome	2	1	1	0	0	4
47	Right Horner's syndrome	2	1	0	0	0	3
47	Left Horner's syndrome	1	1	2	0	0	4

* Average

ured 16, and the left 16. Two years later, when this patient returned with carcinoma of the thyroid gland, the exophthalmometer readings were 13 in the right eye, and 14 in the left. This recession of the globes was probably due to general wasting of the tissues rather than to any specific effect of the cervical sympathetic lesion. In one case of congenital right-sided Horner's syndrome of thirty-one years' duration, the readings were 17 in the right eye, and 19 in the left. On the other hand, in a case of right-sided Horner's syndrome of forty years' duration due to pressure on the brachial plexus, the readings were 11 in the right eye, and 12 in the left; in a case of congenital right Horner's syndrome of fifty-seven years' duration, the readings were 15 in the right eye, and 15 in the left, and in a case of congenital left Horner's syndrome of twenty years' duration, the readings were 15.5 in the right eye and 16 in the left. More convincing still, is a case of left Horner's syndrome associated with syringomyelia; the readings were 15 in the right eye, and 16 in the left, and were the same seven years later.

If we recall the great variability in the origin and course of the sympathetic fibers to the face and eye, and the marked inconstancy of vasodilatation and anhidrosis in association with the more constant symptoms of narrowing of the pupils and palpebral fissures in paralytic lesions of the cervical sympathetic nerves, we can readily assume that injury to the trophic fibers may also be inconstant. It is known, also, that vasodilatation, even if it occurs immediately, usually does not persist, although narrowing of the fissures and pupils usually does persist. In the same way, the injury to the trophic fibers of the nerve is probably often not permanent. It would seem reasonable, then, to expect on purely hypothetic grounds that actual enophthalmos would be an inconstant feature of Horner's syndrome, especially since it is probable that the trophic fibers have their origin at a lower level in the cord than the oculopupillary fibers. This reasoning seems to be supported by the exophthalmometer readings.

Conclusions

1. Demonstrable enophthalmos is a very inconstant sign of paralysis of the cervical sympathetic nerve.

2. Enophthalmos does not occur as an immediate result of cervicothoracic sympathetic ganglionectomy.

3. The enophthalmos associated with Horner's syndrome is therefore probably not due to relaxation of the smooth muscles of the lids and orbit.

4. A tendency to enophthalmos can be demonstrated in a series of cases of Horner's syndrome although the enophthalmos is usually too slight to be definitely demonstrated by exophthalmometric measurements.

5. The enophthalmos is probably due to shrinking of the tissues in the orbit as the result of the loss of the trophic influence of the cervical sympathetic nerve. It is more likely to occur in cases of long standing, but is not seen in all such cases, even if the lesion is congenital.

6. Enophthalmos could be definitely demonstrated in only one of a series of ninety-four cases of clinical Horner's syndrome.

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Discussion: Dr. T. B. Holloway, Philadelphia: I can verify Dr. Wagener's opinion in this matter. I have seen several cases of retinitis pigmentosa in which, several months after operation on the sympathetic, no enophthalmos was apparent.

Dr. Henry P. Wagener, closing: The only suggestion I have to offer is that our more mechanically minded members might try to construct a better exophthalmometer, since in these studies I have found that it is extremely difficult to secure accurate comparative readings.

In certain cases of exophthalmic goiter progression of the exophthalmos may be an important indication of the necessity for operation. Internists who are doing thyroid work make use of the exophthalmometer in watching these cases. The present instruments are not, in my opinion, accurate enough to permit one to determine positively small degrees of progression.

DYSTROPHY OF THE CORNEAL ENDOTHELIUM

(Cornea guttata)

With report of a histological examination

EVERETT L. GOAR, M.D.
HOUSTON, TEXAS

Descemet's membrane was irregularly thickened, the endothelium being composed for the most part of a single layer of cells which in places seemed to be increased to more than one. Over the excrescences the endothelial cells were recognizable only by their nuclei, which with pigment granules were crowded between closely packed warts. This description differs in some details from that of Vogt, whose specimen was neither clinically nor histologically so far advanced. Read before the American Ophthalmological Society, in Washington, May 8-10, 1933.

Few articles have been written on this subject and the condition is not very generally recognized. I have been interested in it for several years, and have made some observations that seem worth recording. So far as I know there has been but one previous effort to tabulate the incidence of the disease, and that in a small series of cases; and only one other case has been studied clinically and the eyeballs subjected to histological examination.

Vogt[1] first called attention to the condition in 1921, describing it as "drop-like endothelial prominences" and again in 1930 in the second edition of his atlas[2] as "Cornea Guttata." In 1924 Basil Graves[3] in his Report to the Lang Clinical Research Committee described the affection under the title "A Bilateral Chronic Affection of the Endothelial Face of the Cornea of Elderly Persons with an account of the Technical and Clinical Principles of its Slitlamp Observations." Dr. Daniel B. Kirby[4] published a short article in 1925 entitled "Excrescences of the Central Area of Descemet's Membrane" and in the same year Drs. Harry and Jonas S. Friedenwald[5] referred to five patients they had studied, with three others that showed epithelial dystrophy together with advanced endothelial changes. In 1931, Dr. Luther C. Peter[6] described the condition as "Dystrophy of the Corneal Endothelium." This name seems the simplest and best yet offered.

Several years ago, while examining a woman aged 40 years, I encountered a condition on the back of the cornea that was very puzzling. Her vision was a trifle below normal and in seeking the cause for it nothing could be found until an examination with the corneal microscope was made. It was then noted that on sweeping the beam across the cornea innumerable bright lines appeared on its posterior face. When viewed in the axis of specular reflection, dark areas several times the size of the endothelial cells were seen, surrounded by a mosaic of normal cells. Not being familiar with the articles recently published, I puzzled over it for months until Dr. Kirby gave me the reference to Graves's article. Since then I have made routine slitlamp examinations on hundreds of patients and have encountered the condition many times. I cite this experience because many well-informed ophthalmologists who use biomicroscopy rather perfunctorily have told me they have never noted the affection.

Previous writers have given such excellent descriptions of the disease, and the technic of its recognition that I shall not attempt a lengthy description. It is always bilateral, though often more advanced in one eye than in the other. The early stages can be recognized only by the slitlamp but more advanced cases may readily be seen with the ophthalmoscope. Beginning in the central area of the cornea, the first sign noted is a few bright silvery lines or flecks, irregular in contour. Graves has well designated these as "glints." They are best seen just outside the posterior reflecting zone. These peculiar silvery reflexes are no doubt due to the fact that the posterior surfaces of the excrescences act as concave mirrors. Everyone who knows slitlamp technic is familiar with the mosaic of hexagon-

al cells seen when the corneal endothelium is in the axis of specular reflection. To obtain this view the arm of the slitlamp must be at right angles to the tube of the microscope and the latter in critical focus. The observer looks through one eyepiece and notes the condition of the cells, shifts the microscope laterally a short distance and through the other ocular sees a different area. By having the patient shift the gaze any spot on the corneal endothelium may be examined in the axis of specular reflection. In the early case of dystrophy when the central area of the cornea is thrown into the axis of specular reflection, a few dark areas several times the size of an endothelial cell will be noted, and these are surrounded by normal endothelium.

As the disease advances, it spreads from center toward periphery, and the normal endothelial cells become scarcer. The glints may be noted over a larger area, and the dark areas in the posterior reflecting zone are numerous. Vision is impaired very little, if any, at this stage. In the third stage no normal endothelial cells are found in the central area, and Descemet's membrane by direct inspection with the corneal microscope is a distinct white line, irregularly thickened. Fine dustlike pigment granules are often seen between the excrescences at this advanced stage, and when they are numerous this pigment probably reduces visual acuity. It will be recalled that the normal Descemet's membrane can not be distinguished optically from corneal stroma. At this stage, with the plus-twenty lens of the ophthalmoscope, the appearance is that of glazing of the deep part of the cornea, but details are lacking. This is best seen against the dark background of the dilated pupil. Two other methods of examination by the corneal microscope give characteristic pictures. Retroillumination from the iris gives much the same appearance as rain drops outside a window pane viewed from within. With a dilated pupil and the microscope focused on the endothelial face of the cornea in the axis of specular reflection from the posterior lens capsule, the excrescences appear as discrete well-defined rounded areas which Graves has called "punctate elements." At this stage vision is usually reduced one or two lines. In the most advanced stages of endothelial dystrophy, the corneal epithelium may be unhealthy. Placing a tonometer on the cornea of one of my patients in this stage caused such destruction of the epithelium that it was necessary to place him in the hospital for several days before healing took place. I have studied several cases in which the vision was lowered to 20/70 in which no cause for reduction of vision could be found except the clouding of the deep face of the cornea. It is true that in such patients a clear view of the macular region is often not obtainable.

The pathogenesis of this condition is obscure, but it is probably degenerative in character and merely an amplification of the process that produces Hassal-Henle warts, which are commonly found near the limbus and have been regarded as a senile change. The fact that dystrophy is never found in young persons suggests that it is a senile or presenile affair. However, many aged persons show no evidence of it, although careful search with the corneal microscope will reveal an occasional "glint" in a very large percent of persons over forty. It is a rather singular fact that drusen are not found with the ophthalmoscope in cases of dystrophy oftener than in those without it. We know that Descemet's membrane is a glass membrane, and that it is laid down by the endothelial cells, which are mesoblastic in origin. Unlike Bowman's membrane, Descemet's membrane has a marked tendency to regenerate and to respond to insult by overregeneration. Graves has theorized that the endothelium, threatened in places with loss (senile?) of its very necessary impervious qualities, may resort to the formation of hyaline material in an attempt to erect a protective barrier against the incursion of the aqueous. If one regards Descemet's membrane as hyaline, this is a fair assumption. My sections show that the excrescences are similar in every staining characteristic to that membrane, which, apparent-

ly, is composed mostly of elastic tissue. Vogt believes a close relationship exists between cornea guttata and Fuchs's epithelial dystrophy. He thinks that in certain cases, due to the thinning of or absence of endothelium over the excrescences, aqueous may enter the cornea and produce permanent injury to stroma and epithelium. This may account for the epithelial changes in certain advanced cases, although I have seen no evidence of injury to the parenchyma of the cornea in such eyes in cases of dystrophy uncomplicated by inflammatory lesions. The Drs. Friedenwald express the opinion that the endothelial changes described are to be considered as the beginning of the epithelial dystrophy of Fuchs, though many cases do not reach the end stage where the epithelium is involved. They quote Kraupa as sharing this belief.

Differentiation of this affection by the corneal microscope presents little difficulty, although a few conditions simulate it very closely. Occasionally in acute iridocyclitis a bedewing of the posterior surface of the cornea takes place that causes a glistening appearance very like dystrophy. However, when viewed in the axis of specular reflection, the cell outlines are obscured and the deposits are smaller and more irregular in size than those of dystrophy. This appearance subsides as signs of inflammation disappear. A like appearance occurs following perforating injuries of the cornea, but this lasts only two or three days. I have noted similar pictures in low-grade uveitis, also following an iris-inclusion operation for glaucoma simplex and in vascularized corneas years after an attack of interstitial keratitis. I have always regarded the type of bedewing of the endothelium found in inflammatory conditions as due to edema of the cells, but Vogt asserts—and Harrison Butler agrees with him—that it is caused by lymphocytes deposited on the endothelium and that there is no such thing as posterior edema.

The cases I have studied in an effort to establish the approximate incidence of the disease have brought out some rather interesting facts. The eight hundred patients tabulated are all private patients examined in my office. Four of the patients in this series had well-marked Krukenberg's spindles, which indicates that this condition is less rare than is commonly supposed.

Age	Number of patients*	Dystrophy	
		Male	Female
21–30	172	0	0
31–40	194	2	9
41–50	229	5	15
51–60	91	4	6
61–70	74	1	7
71–80	34	1	3
81–90	6	0	0
Totals	800	13	40

* Males, 359; females, 441—total, 800.
3.62 percent of males examined; 9.07 percent of females examined; 6.62 percent of all patients examined.

This disease is found in some degree in over 6 percent of adults. Moeschler[7] found it in 4.5 percent of 176 eyes in persons over fifty years of age. It begins in the fourth decade of life. The youngest patient in the series to show the condition was thirty-two years of age. It is about three times as frequent in women as in men. The advanced cases are always in elderly persons, the youngest of this series being a man of fifty-nine years. These cases have not been watched long enough to state positively that they represent different stages in the same process, although I have noted in one patient a drop in vision within four years from 20/40 to 20/70, and an apparent concomitant increase in clouding of the deep face of the cornea. Vogt states that he followed a case for fifteen years and watched a definite increase in prominences with reduction of vision to 6/12. While it is true that in advanced cases other evidence of degenerative disease is often present, I do not believe it is found more commonly with dystrophy than without it in persons of like ages. Many well-advanced cases in my series showed no other evidence of disease.

The sections are from the eyes of a

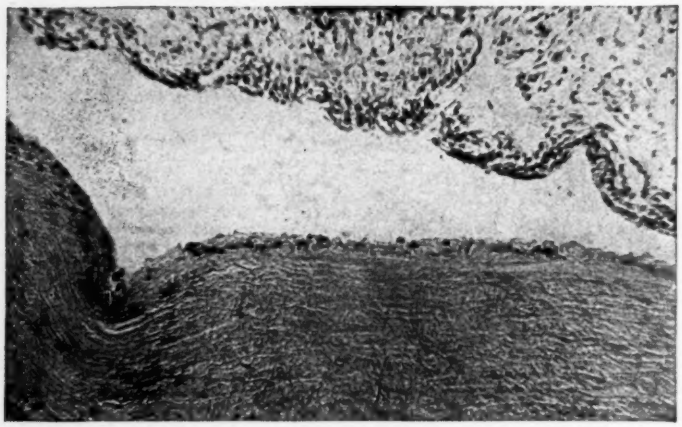

Fig. 1 (Goar). Low magnification showing great irregularity of Descemet's membrane (× 120).

man aged 72 years, whom I first examined June 9, 1932. His corrected vision was O.D. 20/70, O.S. 20/100—1. In the right fundus there was a flat hemorrhage just below the macula. In the left fundus there were several areas of degeneration in the macular region and a few tiny hemorrhages. In the left eye the visual fields showed an absolute scotoma reaching from the periphery of the nasal field temporally almost to the blind spot just sparing the fixation point. In the right visual field there was a small absolute scotoma below and nasal to fixation. The peripheral fields were moderately and irregularly contracted. At the last examination, September 3, 1932, the vision was unimproved and the appearance of the fundi had changed but little except for the absorption of some hemorrhagic areas and the appearance of a few new ones. There were a few spicules in the left lens; the right was clear. A clouding of the corneas could readily be seen by oblique illumination, and by the ophthalmoscope it was noted that it was in the deepest layers. Examination with the corneal microscope showed by direct inspection that Descemet's membrane was a heavy white line, irregularly thickened toward the periphery. Outside the posterior reflecting zone the back of the cornea gave a reflex like beaten silver. I could find no endothelial cells in the central area, but in a rim about 3 mm. wide inside the limbus, endothelial cells could be seen between the excrescences which were numerous and large. The corneal epithelium was smooth and showed no irregularities or areas that stained.

The patient died of pneumonia a few weeks after the last examination. I was unable to obtain the eyeballs before embalming, but the corneas are well preserved. The sections in certain areas show the excrescences very prominently. Descemet's membrane is two or three times as thick as normal, and the thickening is rather irregular. The central third of the membrane contains a few excrescences, the outer thirds contain a great many, and in places they are so numerous that they appear piled one upon another. Some of them are flattened with broad bases, others are semispherical or ovoid. Descemet's membrane is thickest in the areas where excrescences are most numerous. Differential tissue stains show that excrescences and membrane have identi-

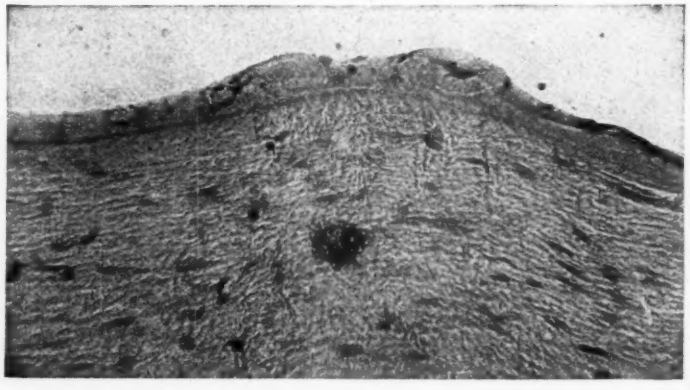

Fig. 2 (Goar). High magnification showing endothelium with excrescences (× 120).

cal staining properties. The endothelium for the most part consists of a single layer of cells, but in certain areas there appears to be more than one layer. In these areas the cell bodies appear to be edematous, but this may be a post-mortem change. Mitotic figures are not found. The cytoplasm of the endothelial cells contains many pigment granules. Over the excrescences the endothelial cells are shown only by their nuclei and these together with pigment granules are frequently crowded in between the closely packed warts. The corneal stroma and the epithelium appear to be normal. There are very few excrescences of the lamina vitrea of the choroid.

Vogt gave the first anatomic description of the condition as well as the first one of its clinical characteristics in the living eye. He removed the specimen from a woman 55 years of age because of intumescent cataract and glaucoma, an eye with 10 D. myopia, in which he had previously noted cornea guttata of a mild degree. His sections show excrescences that are rather flat and differ only from Hassal-Henle warts in that they are in the center of the cornea. Most of the prominences are directed toward the anterior chamber, but an occasional one is reversed. The endothelium over the warts is thin and the nuclei usually are lacking. This case of Vogt's was much less advanced both clinically and histologically than the one I have described.

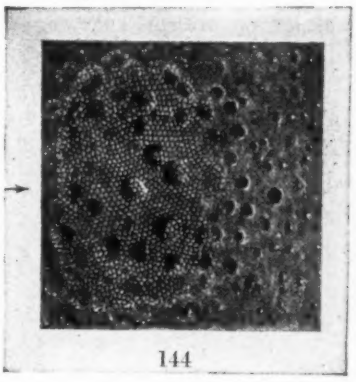

Fig. 4 (Vogt). Excrescences and endothelium in axis of specular reflection. (From Atlas, 1930, v. 1.)

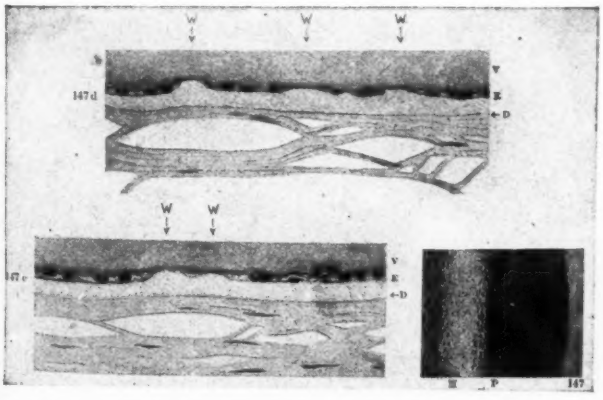

Fig. 3 (Vogt). No. 147 shows the beaten-silver appearance of the endothelium. In nos. 147c and 147d, D = Descemet's membrane; E = endothelium; V = aqueous humor; W = excrescences. (From Atlas, 1930, v. 1.)

Summary

1. Dystrophy of the corneal endothelium or cornea guttata (Vogt) is a clinical entity occurring in some degree in about six percent of persons above twenty years of age.

2. It usually begins in the fourth or fifth decade and is three times as common in women as in men.

3. It is a chronic slowly progressive disease of the corneal endothelium, resulting in irregular thickenings and excrescences of Descemet's membrane. These excrescences are usually directed posteriorly and have identical staining properties with the membrane from which they are derived.

4. Advanced cases of this disease reduce the vision very materially and these may be recognized by oblique illumination and by the ophthalmoscope. Early cases may be diagnosed only by biomicroscopy.

5. Epithelial dystrophy is often found in advanced cases and it may be the late stage of the process which is represented by endothelial dystrophy as an earlier stage.

1300 Walker Avenue.

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[7] Quoted by Friedenwald (5).

Discussion: Dr. Robert von der Heydt, Chicago: The condition reported is that first described by Hassall in 1846. It is not an endothelial dystrophy, because the changes in the endothelium are secondary. In the type called cornea guttata by Vogt, the changes begin in the middle of the cornea. In that first described by Hassall-Henle, Mueller, and Leber, they begin in the periphery. In both instances the original change is a wart-like posterior excrescence on Descemet's membrane. In the type beginning in the middle of the cornea, which may be called cornea guttata centralis, the secondary changes, such as the denuding of the endothelium on the apices of the excrescences, may be due to a trauma of the convection current. This secondary change may cause an imbibition of the corneal tissues by aqueous fluid, and thus bring about the epithelial dystrophy of Fuchs. This has been suggested by the findings of Vogt, Graves, and Friedenwald.

In my office practice I examined 22 cases of cornea guttata centralis during 1932. Eighteen of them were in women and four were in men. In four cases the process was so far advanced that it caused the epithelial dystrophy of Fuchs. Cornea guttata centralis, as well as cornea guttata marginalis, should be classified among the senile changes of the cornea.

Dr. Luther C. Peter, Philadephia: In 1931 I reported 22 cases of endothelial dystrophy before the Pacific Coast Oto-Ophthalmological Society, and my experience coincides practically with that of Dr. Goar. I am impressed with his statistics regarding the frequency of this condition, but probably he found more cases than I did, because my slitlamp studies are only routine after the age of forty. Under this age the slitlamp is used as indicated. The youngest of my series was forty-two; the average age was sixty years. In all the cases reported the incidence of either incipient senile cataract in some stage or nuclear cataract was significant.

The type of patient in whom I found the condition was interesting. In every instance there was evidence of lowered general health. As Dr. Goar states, it is associated undoubtedly with senile or presenile changes.

From a clinical standpoint, lowered vision is important, because this occurred in a number of instances in which cataract did not contribute. Another phase of importance is the significance of this condition in relation to surgery. In my experience these patients are not good surgical risks. I have operated on several patients for cataract complicated by advanced stages of this form of dystrophy, and in each instance there was delayed healing of the wound. I do not think that it is of itself a contraindication to intraocular surgery. It is, however, the accompanying general condition that, in the presence of advanced dystrophy, renders the patient a poor surgical risk.

Dr. Sanford R. Gifford, Chicago: Since the relation of this condition to epithelial dystrophy has been discussed, I am much interested and would like to mention two points.

The first is the question of the clinical distinction between the two conditions without the use of the slitlamp, because I believe we should be able to distinguish at least advanced cases on ophthalmoscopic examination. We cannot expect that every case will be examined with a slitlamp. In cornea guttata the changes can be seen easily with the ophthalmoscope. These excres-

cences are fairly large, and they are regularly spaced. In epithelial dystrophy, on the other hand, with the slitlamp we can see very fine droplets that can barely be seen with the ophthalmoscope with a +20 lens. They are much more numerous in epithelial dystrophy, and are irregularly spaced. Of course, when we examine these droplets with the slitlamp, we find that the epithelial changes stain with fluorescein, whereas the excrescences do not stain.

There has been some discussion by various other investigators as to the relation of epithelial dystrophy to this condition, and a number of observers believe that in most instances, when they see epithelial dystrophy, they will find dystrophy guttata also. I must insist that I have seen some far advanced cases of epithelial dystrophy without this change, and that there are mild cases of epithelial dystrophy with fine epithelial changes and almost no change in the deeper layers of the cornea which have nothing to do with this condition at all, but which may simply coexist in the same subject. I believe the advanced cases are likely to have both conditions but not necessarily so.

Dr. Everett L. Goar, closing: I agree with Dr. von der Heydt that cornea guttata is probably an amplification of a process similar to that resulting in the so-called Hassall-Henle warts. The difference is that the excrescences of cornea guttata appear first in the central area of the cornea and spread toward the periphery whereas the Hassall-Henle excrescences do just the opposite. The excrescences in the central area become much more numerous than those that originate near the limbus.

Dr. Peter states that in practically all his cases he finds some evidence of cataract. This has not been my experience. Advanced cases of dystrophy are usually found in patients over sixty years of age, and naturally such patients show a fairly high percentage of lens changes. I have seen many eyes that showed no other evidence of disease than dystrophy. I do not believe that endothelial dystrophy is an early stage of epithelial dystrophy. The former condition is fairly common; the latter is rare. Many advanced cases of endothelial dystrophy have smooth. normal epithelium. In the one case of true epithelial dystrophy of the Fuchs type that I have seen since beginning this study, there are only a few excrescences on Descemet's membrane. The sections I have shown are from advanced endothelial dystrophy, yet the epithelium and corneal stroma appear to be normal. In certain persons there may be some relationship between the two diseases, but I am inclined to believe that it is a mere coincidence if they do occur in the same eye.

BAND KERATITIS

RAYMOND J. SISSON, M.D., F.A.C.S.
DETROIT, MICHIGAN

The majority of authors have accepted the presence of calcium as the chief component of the opaque substance which forms as a band in the interpalpebral area of the cornea in the condition known by the name band keratitis. An excellent specimen was removed from the eye of an elderly woman, blind in both eyes from glaucoma. This substance was examined with polarizing light microscopes and by means of x-ray spectra, in the endeavor to obtain more complete knowledge on the subject. Information was obtained substantiating the finding of calcium by earlier investigations and additional facts were ascertained concerning the chemical composition. Read before the American Ophthalmological Society in Washington, May 8-10, 1933.

The first description of band keratitis on record was that of Dixon[1], published in 1848. Bowman[2] was working in Dixon's clinic at that time, and he saw a case of the same condition and published both cases in the appendix to his "Lectures on the Anatomy of the Eye," in 1849. Nettleship[3] collected and published all reported cases up to 1879.

Fig. 1 (Parson's Diseases of the eye). Band Keratitis.

Many synonyms for band keratitis are found. Descriptions of this condition are under such names as, calcareous deposit, calcareous film, band-shaped opacity, symmetrical opacity, trophic keratitis, zonular opacity, keratitis petrificans, and bandförmige Hornhauttrübung.

Two distinct clinical types of band keratitis are differentiated. Both are located in the interpalpebral zone of the cornea. The primary type occurs beneath the epithelium of an eye apparently otherwise healthy; the secondary type appears in an eye long blind from glaucoma, iridocyclitis, sympathetic ophthalmia, or in a shrunken eyeball.

Nettleship[4] observed that when the opacity began at the center it spread horizontally toward the margin, remaining widest at the center; that when it began at the sides and coalesced near the center of the cornea, the center remained the narrowest and least opaque portion. The direction of the stripe is not absolutely horizontal, it slopes a little temporally and inferiorly. The lower or lower inner half of the pupil is usually the first to be covered. The opacity does not reach the limbus but comes nearer to it on the nasal than on the temporal side.

Both types are found in the exposed portion of the cornea. Exposure has been advanced as a cause. In advanced glaucoma, a pannus occurs with great frequency. This should better nourish

Fig. 2 (Sisson). Posterior surface of a specimen of band keratitis, 3 x 1½ mm., removed from the cornea of an elderly woman (× 12).

the zone in which the opacity forms. It is true that a lessened tactile sensation is present in this condition, and this may have some bearing on the etiology. It has been stated that oxalate of lime is abundant in the perspiration and blood of gouty patients. I have had the opportunity of making complete blood studies on two cases of each type. There were no definite blood changes in these four cases, and I could find no recorded blood changes in any of the reported cases.

Ball[5] stated that a congenital form exists. I have not been able to verify that from the literature. One case is reported by Usher[6] of symmetrical opacities occurring in the eyes of a boy aged eight and his mother. This does not appear to be, however, the condition described as band keratitis.

Schweigger[7], Obertuschen[8], and Lewkowitsch[9] found band keratitis in otherwise normal eyes. Landesberg[10] cited a case of band keratitis in a patient who had been very ill with influenza. The patient refused the advised iridectomy. He went home, and having a wine press in his home, drank an abundance of fruit juice and also ate a large number of grapes for several months, and at a later examination no trace of the band was observed.

People engaged in the manufacture

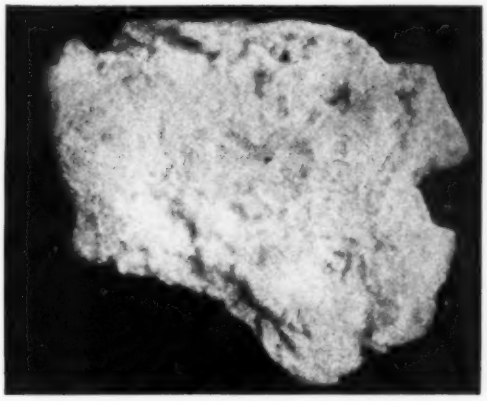

Fig. 3 (Sisson). Anterior surface of a specimen of band keratitis, 3 x 1½ mm., removed from the cornea of an elderly woman (× 12).

mary type was the forerunner of the secondary type and that an eye with a subepithelial band opacity should be regarded as preglaucomatous. This has not subsequently been verified.

Magnus[13] suggested that inasmuch as the band-forming opacity was really a nutritional disturbance of the cornea following previous common eyeball disturbances, the name "keratitis atrophia" be given to the condition. Magnus also thought calcium was deposited through infiltration and precipitation of the conjunctival secretion.

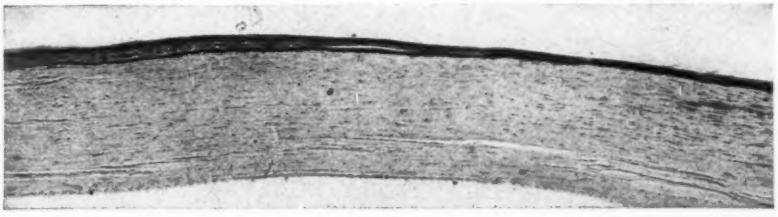

Fig. 4 (Courtesy Army Medical Museum and Dr. J. S. Friedenwald). Section showing band keratitis with compression of epithelium.

of naphthalene and analine dyes have a similar condition develop, due to long-continued irritation. The cornea clears with occupational change.

There were many cases of band-forming opacity of the cornea reported in the older literature, which were apparently not the condition that we today recognize under the name of band keratitis.

Von Graefe[11, 12] thought that the pri-

Topolanski[14] cited three cases of band keratitis in men who prepared rabbit fur for the manufacture of hats. In the preparation of this fur, it was explained that the air was heavily laden with small particles of rabbit hair and dust particles to such an extent that the clothing of the workers was covered with dust and was gray in color. Topolanski found microscopical rabbit fur in

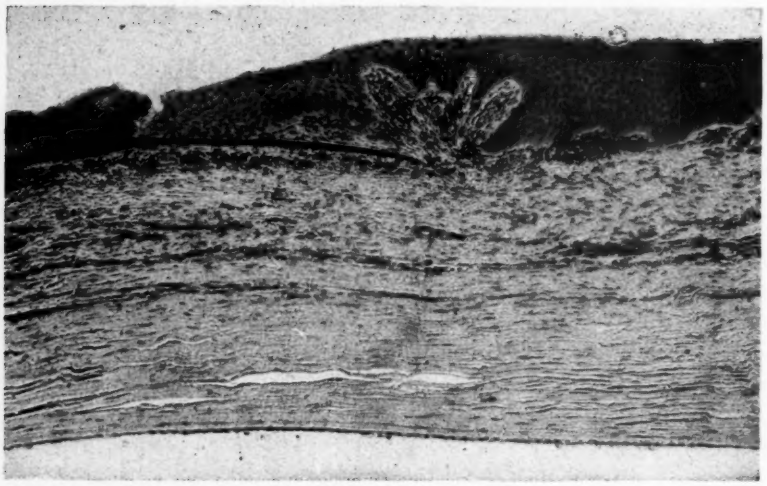

Fig. 5 (Courtesy Army Medical Museum and Dr. J. S. Friedenwald). Section showing lateral termination of band in band keratitis. Vascularized fibrous tissue has proliferated over the end of the band and has elevated the epithelium. Giant cells are present in the area.

excised specimens of the opacity. Cases have also been recognized in brick layers, plasterers, cabinet makers, steel workers, and in people very ill with heart or kidney diseases.

The occupational status in the reported cases was so varied that no common external agency could be noted except in that of hat makers and chemical workers.

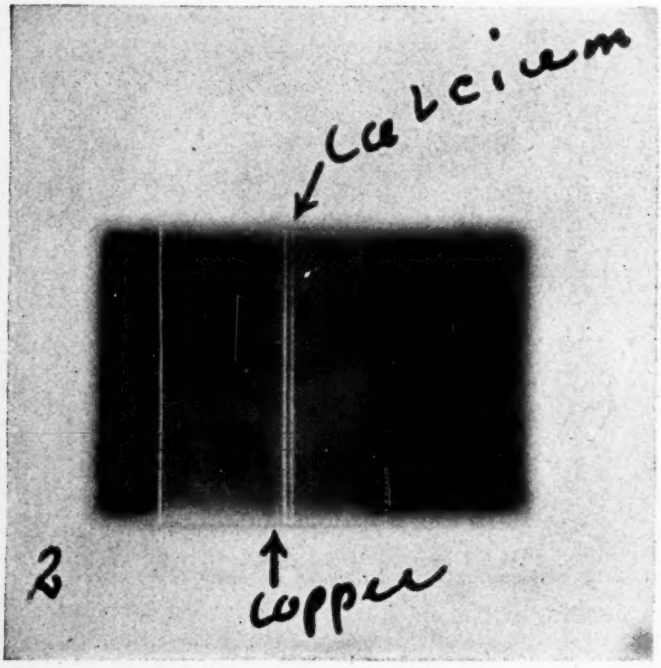

Fig. 6 (Sisson). Ca absorbed in growth in eye. 6 hours. V = 60. SiO_2 crystal.

The etiology is apparently varied. The predominance of opinion has placed three classifications in prominence. Band keratitis occurs:

1. In otherwise normal eyes of perfectly normal individuals frequently associated with long-continued irritation.
2. In patients very ill, but as a separate entity.
3. In degenerated eyes especially associated with glaucoma, phthisis bulbi, and iridocyclitis.

A uric-acid diathesis has been suggested but no proof offered to substantiate this view. The condition is so rare that some special dysfunction must exist which effects the nutritive condition of the eye. Glaucoma is frequently associated with the secondary type.

There may be no symptoms present in this condition. This is particularly true of the primary type and the beginning of the secondary type. As either type progresses centrally, vision is obscured. About one half of the cases have irritability and lacrimation. Coby[15] has noted a turbidity in the region of Bowman's membrane, near the limbus, with dark, almost perfectly round holes, years before the band made its appearance to the naked eye. The opacity always develops extremely slowly, years being required for its completion.

The secondary type cause the greater irritation from its rough surface rubbing on the conjunctiva of the upper lid. This type is slightly elevated, and may have a very rough surface as in figure 3.

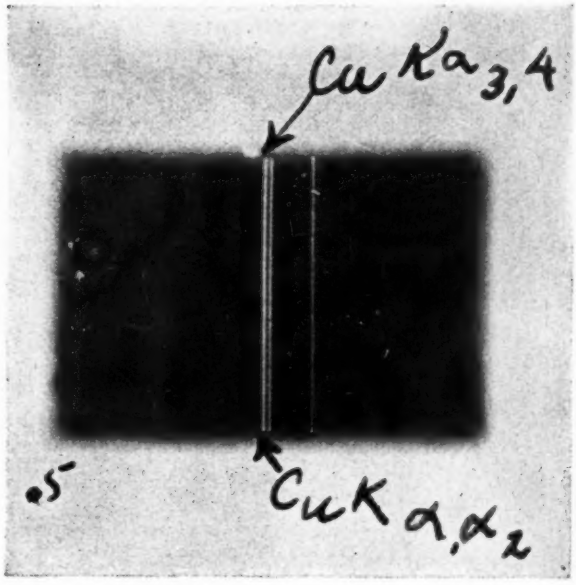

Fig. 8 (Sisson). Plate in region of Pkα lines. 30 minutes gypsum crystals. No substance on anode shows CuKα, in 4th order. Phosphorous region.

The opacity always occurs in the exposed portion or the palpebral-fissure area of the cornea and never extends to the limbus. The exposed part of the cornea is invaded in a nearly transverse diameter by one or two patches. If two patches, they start near the limbus and merge centrally. The corresponding parts of the pupil and iris are hidden. The condition is usually bilateral, one eye preceding the other. The opacity is usually sharply limited, the remaining cornea being clear. The length is about twice the width and the size of the opaque zone may be 5 x 3 mm. It may be widest at the middle or taper to one end. The color of the opacity may be grayish white, white, or light brown. At the onset of the condition, there are scattered spots with black dots or cracks in the substance. Nettleship[16] has observed an occasional iridescence. An arcus senilis may be present in addition to band keratitis.

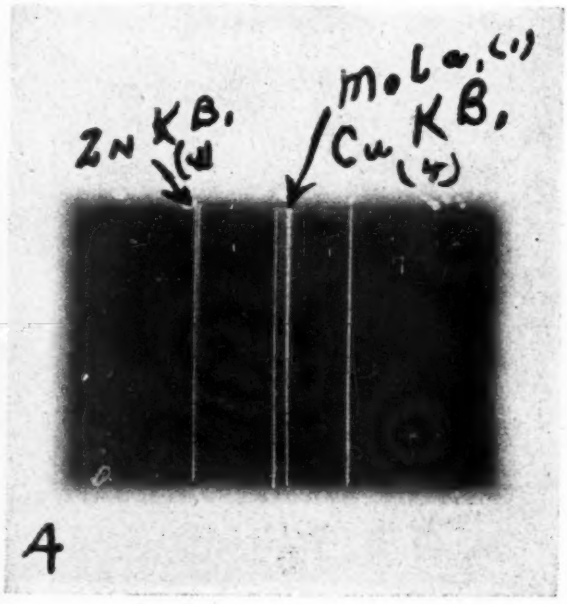

Fig. 7 (Sisson). Plate in region of SKα lines, MoLα lines as reference; gypsum crystals. Sulphur region, no substance on target.

The primary type does not seem to be associated with any other ocular disease. The epithelium is smooth over the opacity and this type causes very few symptoms until very advanced. Then vision may be reduced and irritability exist. In the second-

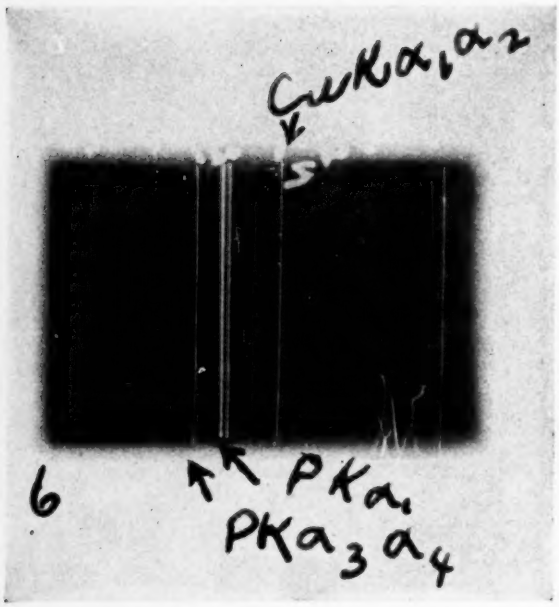

Fig. 9 (Sisson). Unknown substance on anode. Gypsum crystal. V = 70. Shows PKα1, Kα3, Kα4. Thirty minutes.

ary type, the epithelium loses its smoothness and polish and becomes steamy with an irregular surface from the pitting and studding of the opacity. Considerable irritation then occurs.

The opacity of band keratitis is located in Bowman's membrane and, in addition, in the anterior layers of the stroma. Occasionally, newly formed tissue is present between the band and the epithelium. The length and shape of the band varies; it appears to be about as wide as Bowman's membrane with sharply limited edges, and is composed of a granular substance.

Verhoeff[17] (personal communication) states: "By studying the changes seen in band keratitis from the periphery towards the center, it can be seen that the granules are first deposited either between the epithelium and Bowman's membrane or in the anterior surface of Bowman's membrane. I cannot be perfectly sure which. They are, however, never deposited in the epithelium itself. As the deposit increases, it involves more and more of Bowman's membrane from without inwards until the whole of Bowman's membrane is occupied by the granules. The staining of the granules indicates that they are largely calcium, but it is possible if not probable that the original deposit is lipoid in nature and that calcium and other salts are then deposited in the lipoid substance. The fact that the deposits appear first in the outer part of Bowman's membrane would seem to indicate that they are due chiefly to some substance acting from without, although, of course, the deposits may not be directly derived from this substance. Microscopically there does not seem to be any essential difference between the primary and secondary types of band keratitis, but in the secondary type the process is often more marked and involves the anterior layers of the corneal stroma in addi-

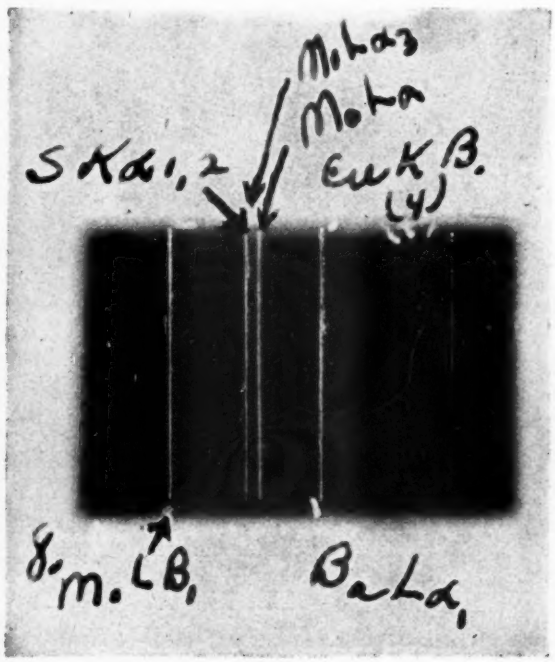

Fig. 10 (Sisson). Material on target shows Skα1, 2; not on Fig. 9.

tion to Bowman's membrane."

Mineralogical examination. Dr. Albert B. Peck of the Department of Mineralogy at the University of Michigan made a crystallographic examination of the excised specimen, and reported that the substance was hard and brittle, and comprised an aggregate of very fine grains or fibers having an index of about 1.54-1.55, moderately double refracting, gave a poor biaxial figure, but showed no crystalline outline. Except for the biaxial figure, this would approach some type of quartz or silica. There was insufficient material for Dr. Peck to make a more conclusive statement.

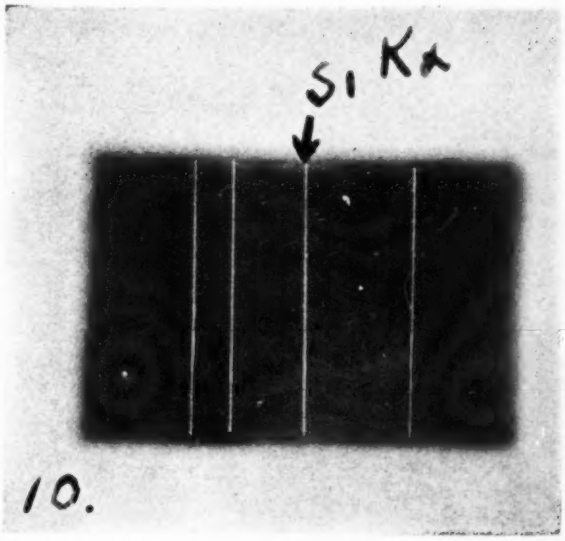

Fig. 12 (Sisson). SiKα line in sample.

Chemistry. The examination of flakes of the opacity by Thomas Taylor was reported by Dixon[18] in his first report. Taylor found them to contain certain phosphates and carbonates of lime. Nettleship[3] had Professor Miller examine some flakes and he reported calcium phosphate and magnesium with calcium carbonate. Plowman examined the scrapings in another case for Nettleship, and reported that he found no crystalline outline, but microchemically calcium phosphate and carbonate. Magnesium was not found.

Best[19, 20] quotes Adamkiewicz as examining a specimen for sulphur, and finding no free sulphur. Galezowski[21] added 10-percent hydrochloric acid to particles and gas was evolved, suggesting a carbonate. Bodenstein[22] described band keratitis as consisting of amyloid, and Goldzieher[23] described the presence of colloid bodies.

Dr. G. A. Lindsey[24] of the Physics Department at Ann Arbor has x-ray spectroscopic equipment which makes very exact determinations of the elements in a substance of this type. The material was examined for constituent elements (not compounds) by means of the x-ray spectra. Tests were made for only certain suspected elements; viz., Ca (atomic No. 20), S (16), P (15), Si (14). The test for calcium was done by absorption. The absorption spectrum produced a bright line with dark spaces between, the places of the absorbed rays being marked by dark lines or bands. An emission spectrum is one produced by the substance as a

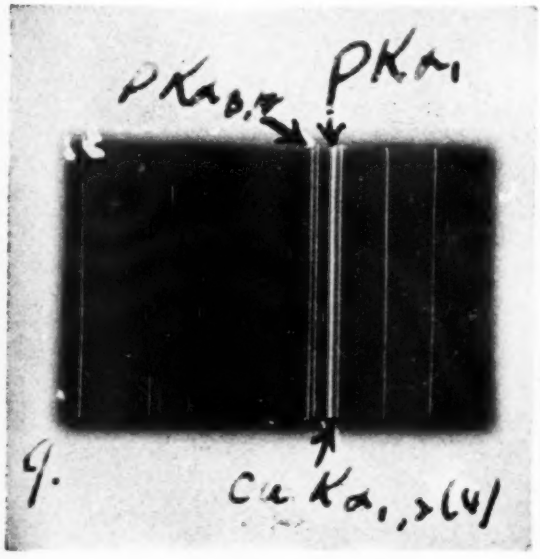

Fig. 11 (Sisson). Phosphorous emission from substance sometime after application, gypsum crystal. V = 40. Time, 1 hour.

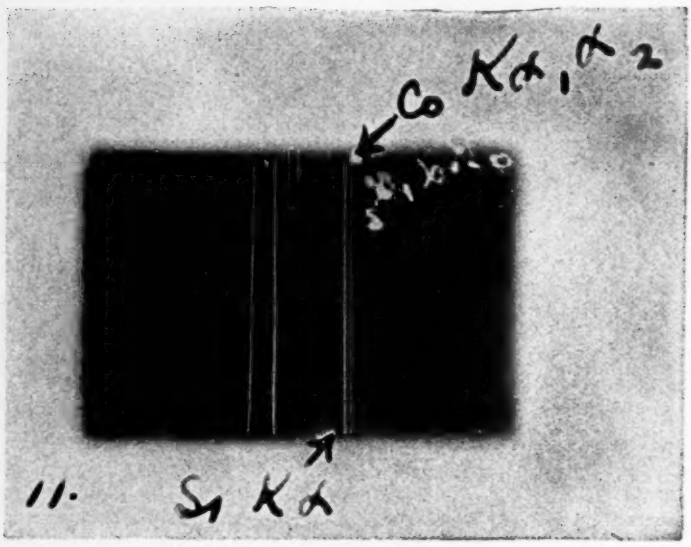

Fig. 13 (Sisson). Same as in Fig. 12 but with cobalt on target giving reference lines. SiKα faintly visible.

source, and is recorded oppositely to that of the absorption spectrum, namely, as bright lines.

Spectrographic methods differ from those of spectrometry in the use of a photographic plate rather than the ionization chamber as an indicating device.

A beam of x-ray of known wave length may be taken, and under proper mechanical conditions, it may be passed through an unknown crystal, recording the angle at which the beam emerges upon the photographic plate. From this impression on the photographic plate, a calculation can be made of the spacings of planes of atoms or ions within the crystal, and in this way the crystal may be identified. The exact reverse of this system may also be used. The unknown substance may be placed upon the target of the x-ray tube and its characteristic radiation generated. This unknown beam is then passed through a crystal of a known characteristic substance, such as calcite, having a fundamental spacing, d = 3.03 A.U. and the wave length of the beam determined.

In actual practice a combination of these methods is used to avoid errors. For example, a tube having a copper target may be used, upon which some of the unknown substance is placed. This combined beam would then be taken off and resolved spectrographically through a known crystal. The relative positions of the lines obtained would then leave room for error.

A small sample of the specimen taken from the eye shown in figure 2 was fixed in a small hole in a piece of copper and the x-ray beam passing through the sample was disbursed into a spectrum by a quartz crystal. This spectrum was recorded on a photographic plate, and lines which are shown in the accompanying figures appeared. These lines are very delicate and have been reinforced by retouching in order to show more clearly the absorption or emission lines. In the figures shown, the increasing wave lengths are toward the right, and the white line, due to the absorption of calcium is about 1 mm. to the right of the black lines. In figure 6 a definite white line appears in the spectrum near the heavy line. The black absorption lines were due to the copper target and were of the second order. The line due to calcium is about 1 mm. to the right of the black copper-target line. No other element would give an absorption like

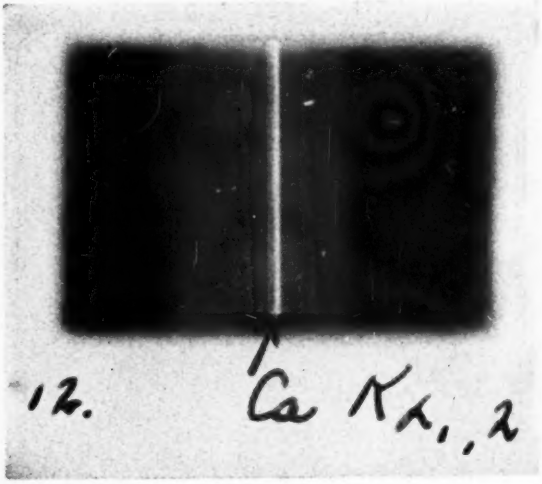

Fig. 14 (Sisson). CaKα$_{1,2}$ from sample. Very strong lines. Time, 40 minutes.

this at this point in the spectrum, so it is conclusive evidence for the presence of calcium.

For other elements, the wave length is much longer, and the sample was not suitable for an absorbing screen. The emission spectrum was therefore taken. The $K\alpha_1$ and $K\alpha_2$ lines for these light elements are not well separated, as those for copper are in figure 6.

First, with a new copper target, two plates were taken in the regions where fall the K lines of sulphur and phosphorous, respectively. Figure 7 shows the region for sulphur. A little MoO_2 was placed on the target so as to have the $MoL\alpha$ lines for convenient reference. Figure 8 shows similarly the region where the phosphorous $K\alpha$ line should appear.

After these two plates were taken, a portion of the sample was placed on the target, and figures 10 and 11 were taken off the same regions in the spectrum as those of 7 and 8. It may be seen that the lines marked $SK\alpha_{1,2}$ in figure 10 and those marked $PK\alpha_1$ and $PK\alpha_{3,4}$ in figure 11 were not on the previous plates taken before the material was rubbed on the anode.

A test for silicon was made in the same way. Figure 13 has cobalt lines for reference. Through them the identification of the lines marked SiK on figures 12 and 13 are identified as being due to silicon. It is faint, partly because of the long wave length and partly because of the small amount of the sample. Figure 14 shows very strong emission lines from the sample, thus corroborating the result from absorption sample in figure 6. From the study, Dr. Lindsey concluded there were large amounts of calcium and phosphorous (probably calcium phosphate) in the sample, with small amounts of sulphur and silicon. The plate of the spectrum and the interpretation were made by Dr. George Lindsey of the Physics Department, University of Michigan at Ann Arbor.

Conclusion. The crystallographic examination indicated that this substance has an index of about 1.54 or 1.55, was moderately doubly refracting, but there was no crystalline outline. The impression from this examination was that silicon was present. The x-ray spectra proved the presence of large amounts of calcium and phosphorous with small amounts of sulphur and silicon in an advanced case of band keratitis of the secondary type. It is possible that in the earlier stages of this condition the elements above are present in such small amounts that they could be easily overlooked. The x-ray spectrographic method is suggested to determine in the earlier cases the composition of the particles.

Treatment. Removal by scraping with a sharp spud under cocaine anesthesia is comparatively easy. The large epithelial type may be removed almost intact. The subepithelial type may be chipped off. The substance is fairly firmly united to the anterior layers of the substantia propria of the cornea. The cornea under the opacity is clear after the removal of the band. Spontaneous cures have been reported.

The epithelial deposit has a tendency to chip off spontaneously. This is necessarily a slow process. Chemical dissolution is obviously impracticable; it would be very difficult to judge the depth to which the chemical should be allowed to penetrate.

Landesberg assumed that although fruit juices might not be a specific treatment against this type of corneal opacity, the patient's return to health might be favorably influenced and this, in turn, might have a favorable influence on the nutrition of the cornea.

The staying process ascribed to an iridectomy may be due to an improvement in the fluid exchange and this, in turn, may have a favorable effect on the nutritive condition of the eye.

The opacity does not have a tendency to recur.

825 David Whitney Building.

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Discussion: Dr. Arnold Knapp, New York: Band-shaped opacity is a subject of great interest to all ophthalmologists. There are two questions I would like to ask Dr. Sisson. Does he consider this opacity a primary condition, or is it secondary to other histologic changes? Within recent years our attention has been drawn to the association of changes on the surface of the cornea with changes in the corneal endothelium, and I would like to ask Dr. Sisson whether he found any evidence of inflammation in the deeper layers of the cornea. We are all familiar with the band-shaped opacity which occurs in old, degenerated eyes, but there is a second type which occurs in iridocyclitis in young children, in whom the eyes are comparatively healthy. I would like to ask Dr. Sisson whether he has any explanation for its formation.

Dr. Raymond Sisson, closing: Between the two distinct forms of band keratitis there is no essential difference except the extent of the deposit. The primary condition seems to be associated with no other ocular disease. The secondary form is found in degenerated eyes, such as those affected with iridocyclitis, and is very frequently present in glaucoma. Microscopically, there are no changes differentiating the two types, except in the extent of the involvement.

As to an explanation of the occurrence of band keratitis in iridocyclitis, there have been many theories, one of which is that there is a nutritional disturbance of the cornea. Lowered sensation occurs characteristically in this type of cornea.

SUGGESTIONS FOR THE PREVENTION OF BLINDNESS

ADALBERT FUCHS, M.D.
VIENNA, AUSTRIA

Measures for combating blindness must necessarily be suited to the community in which it appears. In Austria, campaigns are under way with a view to educating the masses in ocular hygiene and especially in the prevention of accidents to children. The author recommends that in Egypt, the hotbed of ophthalmias, a vigorous campaign against the fly be instituted, to test its guilt as a germ carrier. From the Allgemeine Poliklinik.

On my journey through Spain to the International Ophthalmological Congress at Madrid, I passed through many small villages and towns and was struck by the relatively large number of one-eyed and blind people. Apparently the incidence is far higher there than in Austria or in Italy, and may have a constitutional cause. The population of Spain probably contains a good deal of Semitic blood, since Hispania was at first colonized and governed by the Semitic Phoenicians and later on Spain was invaded and ruled for centuries by the Arabs.

At any rate, I realized on this journey again that the means of preventing blindness must necessarily differ in the various countries and that general directions can be given only for certain districts.

At the meeting of the International Association for the Prevention of Blindness I had the honor, as Delegate of the Austrian Society of the Red Cross, to report on my activities in Austria. I intend to repeat a few details here as they may be of general interest, and to add to them a proposition which I made privately to some prominent Egyptian oculists.

In the prevention of blindness three great steps have been taken. The first and greatest was the prevention of gonorrheal conjunctivitis of the newborn by Credé's procedure, the second the prevention of accidents in industrial establishments by preventive measures, and third the supervision of infectious diseases of the eye.

By the beneficial institution of school inspection by physicians, in recent years, in some cities, the eyes of all pupils have been examined and whenever necessary these children have been referred to oculists. Sight-saving classes are a great advance too, but cannot be considered a measure for the prevention of blindness.

The most essential thing now to be done in our country for further prevention of blindness is public enlightenment, instruction about hygienic measures on behalf of the eye in general, and the protection against ocular diseases and injuries to the eyes of children in particular. We have an excellent example here in the propaganda the dentists and pediatricians have made for brushing the teeth; its success has been so great that even poorly educated people have begun brushing their teeth.

In Austria, I instituted a popular propaganda for ocular hygiene. In 1929, 12 pictures two to three feet long, colored and provided with versified legends, designed to attract parents and children, were exhibited by me in the popular hygienic exhibition "Mother and Child." The prevention of injuries in infancy and the importance of early examination and care of the eyes were impressively represented there.

These pictures (see the figure) were afterwards included in the traveling Hygienic Exhibition of the Austrian Association of Hygiene*. This exhibition travels about the country during the warmer periods of the year and stops for a week in the smaller towns also. A specially trained woman doctor shows the visitors around, at the same time delivering a short lecture on hygiene. In this manner the exhibition, which enjoys great popularity and has a good run, is seen by one hundred thousand visitors each season; moreover, all of these visitors are really instructed. By the aid of the pictures supplied by me, attention is also called to the dan-

* Oesterreichische Gesellschaft für Volksgesundheit.

gers threatening children's eyes; three pictures, for instance, pointing out the dreadful consequences of sympathetic ophthalmia.

I have conducted privately a second kind of propaganda, consisting in the following procedure: In the Almanac of the United Association for the Blind, I had an essay published "Hygiene of Children's Eyes" and had a very large number of copies printed. For years these have been distributed in my service at the Allgemeine Poliklinik of Vienna to all parents who bring their children to my out-patient department. Recently, however, I have resolved, in agreement with the Red Cross, upon another procedure.

We are preparing to issue four informative pamphlets. The first, for the first two years of life, will be handed by the attendants in the lying-in hospitals and infants' homes, to the parents or nurses of children. The second informative pamphlet will embrace the second to the sixth year of life and will be distributed by children's hospitals and kindergartens. The third concerns the period from the sixth to the fourteenth year of life and will be circulated by the schools. The fourth, destined for adults, will be delivered by the sickness and health-insurance companies to their clients.

By these means I hope to prevent, in so far as is possible, injuries threatening children's eyes, to point out the necessity of cleanliness, of light and air, and the most rational diet possible, thus saving the sight of many an eye.

ZVM AVGENARZT FÜHR JEDES KIND OB SEINE AVGEN HEIL NOCH SIND
NIE OHNE ARZT DIE BRILLE KAVF SONST GEHEN DEINE AVGEN DRAVF
DER HANS SIEHT MIT DER BRILLE HERRLICH DER FRANZ DAGEGEN SEHR BESCHWERLICH
DRVM WIRD DER HANS AVCH MILLIONÄR DEM FRANZ ERGEHT'S IM LEBEN SCHWER
MESSER GABEL SCHERE VND LICHT GEHÖREN FÜR KLEINE KINDER NICHT
ZÜNDHÖTCHEN BRÄVCHT ENTZVEI BEIM SPIELEN PVSTET DIR INS AVGE MITTEN AVG VFTS SCHLVSS
DER STÖBEL BLEIBT OFT VOM GEWEHR ER TRIFFT DAS AVG VERLETZT ES SCHWER
VOM GVMMIPFEIL ALS SPIELZEVG LASS TRIFFT ER DAS AVG VFT AVS DER SPASS
AVS CELLVLOID EIN PÜPPCHEN KLEIN KANN DEINEM KIND GEFÄHRLICH SEIN
MIT PFEIL VND BOGEN GIB FEIN ACHT SIE HABEN MANCHEN BLIND GEMACHT
FEHLT NVR EIN AVGE GOTT SEI DANK DOCH MEIST WIRD AVCH DAS ZWEITE KRANK
INS BLINDENHEIM FÜHRT NVN DAS KIND DIE MVTTER DIE JETZT GÄNZLICH BLIND

Fig. 1 (Fuchs). The pictures in the first row show the advantages of having correcting glasses. The second and third rows of pictures depict the terrible danger to eyesight from ill-advised toys and from sympathetic ophthalmias.

By the indefatigable work of English and Egyptian ophthalmologists, especially by the ingenious organization created by A. F. MacCallan, more has been done in Egypt for combating blindness than anywhere else in the world. One can appreciate at their full value the convincing results of this work by perusing the Annual Reports of the Ophthalmic Section of the Department of Public Health issued by the Ministry of the Interior, in Egypt. [Its enormous work can be estimated by a few statistics: In 1920 there were fifteen stationary and five traveling ophthalmic hospitals in Egypt, ten years later 32 stationary and 14 traveling ones. Hence, their number had been more than doubled. This fact is made still more impressive by the number of new patients, which increased from 94,921 in the year 1920 to 526,406 in the year 1930, hence to more than half a million. Besides, 11,717 school children were examined and treated in the same year, almost three times the amount of those treated ten years ago.]

The results of this herculean work were extremely beneficial, as evidenced by the fact that of the new patients reporting to the ophthalmic hospitals in 1920, 9.1 percent were blind in one eye and 6.6 percent in both eyes, while in 1930 these figures had decreased to 4.7 and 1.7 percent for the blind in one and both eyes respectively, a very great success, indeed*. The success also became very evident by the decrease in the number of corneal opacities in school children. In 1920, 8.4 percent of school children showed opacities of one, and 4 percent of both corneas, while in 1930 the numbers had fallen to 4.59 and 1.89 percent, respectively, hence to about half.

This success, however, impresses even those who walk about in the open street. Whereas in 1911, when I first came to Egypt, long rows of blind men could be seen moving through the streets and bazaars, closely clinging to each other and led by a companion with barely a vestige of eye sight remaining, I could no longer see that spectacle on my last visit in 1929, the numbers of the blind in the streets of Cairo having in the meantime decreased so greatly.

In spite of all that has hitherto been done in this direction and in spite of the colossal work already performed, the campaign against blindness, that is, the campaign against ophthalmia and trachoma, continues to be a serious problem. It is generally known that the incidence of trachoma has scarcely decreased in the last ten years. In 1920 an average percentage of 7.4 of the children in an elementary school was free from trachoma, and in 1930, a percentage of 7.86; consequently, almost the same number. The treatment of the trachomatous school children was nevertheless very successful inasmuch as dangerous types of trachoma were brought to scarring. Thus in 1920, 19.1 percent had suffered from severe trachoma (stage I and stage II), whereas at the close of the school year only 8 percent showed such malignant types. In 1930, the number of school children suffering from severe trachoma (stage I and stage II) had even risen to a percentage of 26.8. At the end of the term this had, however, been reduced to 8 percent.

Despite the great amount of work and the enormous expense, the relative incidence of the causes of blindness in Egypt has remained the same and has not changed as it has in other countries. In 1920, 76 percent of blindness was attributed to affections of the conjunctiva, and about 78 percent in 1930. This large number of cases with loss of sight is, however, not due to trachoma, but, as has long been known, to the ophthalmias, such as purulent infection by gonococci, pneumococci, Koch-Weeks bacilli and others†. The ophthalmias are

* The census of the blind resulted for 1907 in a percentage of 4.5; for 1917 of 4.3; and for 1927 of 2.3 (Bull. Ophth. Soc. of Egypt, 1932, Report of the President).

† Thus according to the Annual Report of the Egyptian Home Office for 1931, the gonococci, Koch-Weeks bacilli and pneumococci cases numbered 26,880, 11,831 and 1590, respectively. It stands to reason, that these data can only cover the patients in eye hospitals. In the same year 9,489 patients blind in both eyes and 38,433 blind in one eye were registered in the eye hospitals. One sees how incredibly these numbers coincide!

the great danger, their complications the main cause of the blindness in Egypt.

It appears from this that the work done is enormous, the amount of blindness having diminished to an extraordinary extent, but it has proved next to impossible to diminish the spreading of the ophthalmias and trachoma to a greater degree. It is much the same as if the mortality of an epidemic of typhoid fever had been substantially reduced, the number of the sick, however, to a small extent only.

Now, what can be done in this respect?

In an address delivered in 1932 to the Egyptian Ophthalmological Association, El-Kattan suggested some new measures. He proposed an "Assistance Nationale Publique" which should embrace all villages and towns. Each place should furnish an able man willing to be instructed in the washing of and making instillations into eyes and able, too, to give milk injections by way of first aid. This man should also help the "Assistance Ambulance" which will refer the patient to the nearest eye hospital. Besides, an extensive propaganda should be conducted by cinemas, posters in the villages, newspapers, speeches in the mosques, and so forth, in order to enlighten the people. Moreover, a new law should be passed for establishing compulsory notification of acute ophthalmias and threatening the parents with penalties should it not be obeyed. El-Kattan is of the opinion that such a plan, if carried out exactly, would eradicate 70 percent of the cases of blindness in Egypt.

All these suggestions are no doubt excellent and will, if put in practice, be of great benefit, but I think they fall short of the mark, since the main problem is this: What are we to do in order to prevent the *infection* of people, especially of the babies, for it is they who fall ill in exceedingly large numbers. In all ophthalmias as in every epidemic it is essential to combat and diminish morbidity rather than mortality.

What, therefore, can be done in order to diminish the infections? Here, above all, I should like to indicate an item which points the way to new possibilities of success.

Whoever comes to Egypt for the first time and passes through the villages is revolted at seeing masses of flies covering the eyelids of children and adults affected by purulent inflammation, in such numbers that the eyes are black all over. Of course, there are flies in other dusty countries, too, but nowhere in all my travels in different parts of the globe have I seen them in such abundance. Thus the following conclusion forces itself upon every oculist: There is a close relation between the enormous number of purulent ophthalmias and the great number of flies on purulent eyelids; without doubt the flies communicate the germs*.

Therefore the campaign against flies is an indispensable measure against the spreading of the ophthalmias. But he who knows the poverty and low standard of life of the fellahin, the inhabitants of the valley of the Nile, he who has ever seen the dust, the huts of mud and the dirt, will despair of the possibility of conducting an efficacious campaign against the flies.

For all that, I feel sure that now the moment has come when this battle against the flies must be attempted, first as an experiment. It will be much easier now than it was some years ago, because we now have modern means for combating gnats and flies at our disposal; namely the atomization of petroleum preparations such as Flit, Flytox, and so on.

My recommendation is this: A whole village of about 1000 inhabitants, unfrequented by strangers, should be chosen, if possible situated in an oasis or on the edge of the desert, far from an eye hospital, so that patients with eye complaints cannot be treated to any great extent. The villagers should be examined and registered by ophthalmologists and statistics started of one-eyed people, blind persons, people with healthy and diseased eyes, and corneal scars. It is of course also necessary to

* The importance of flies for the transmission of eye diseases was, besides others, specially emphasized by Eloui Pascha and Elliot.

ascertain the exact number of the inhabitants and their ages. Then the village is left to itself, except that a sanitary assistant, who, however, is not to occupy himself with the treatment of the sick, will remain in the village. All the acute inflammations of the eyes are to be noted and registered by him. In this way an exact survey of the frequency of ophthalmias in the course of a year will be obtained. At the beginning of the next year all the natives of the village in question are again to be examined and then the antifly campaign should commence throughout the whole village. Flit-sprays should be distributed among all families, the houses daily sprayed, and at the same time a rational propaganda be displayed with a view to inducing people to destroy and at once bury or burn all waste products. The sanitary assistants would then stay on in the village for the second year and again register the cases of acute ophthalmia and see to it that the local campaign against the fly was carried through. At the end of the second year the third examination would take place.

In this way it would prove possible to form a safe estimation of the importance of flies in spreading ophthalmias and I am convinced that this experiment would lead to as impressive results as did the sanitation of the isle of Brioni by Koch, who freed it from malaria. In the case of malaria, we have seen how successful the campaign against the anopheles mosquito proved, though it seemed extremely hopeless at the outset.

To show the importance of flies in the epidemic is the principal aim of my proposition, it should prove this connection statistically and thereby—should my assumptions prove true—convince the government as well as the physicians.

Is such a campaign, at least in the above-mentioned trial, so difficult? I do not think so; although in Egypt there are always flies in plenty, the most important season for the campaign against the fly falls within the hot months and would last from three to four months only. These hot months constitute the period during which ophthalmias increase so very considerably and the campaign against the fly should be particularly energetic at that time. The campaign with the Flit sprays will prove very easy, because every little Arab boy will be happy at having the opportunity of using such a spray. The expense of such an experiment of possibly far-reaching importance will not be exorbitant either, because firms selling insect exterminators would no doubt grant a great reduction to the Egyptian Board of Health, this trial being naturally of the greatest importance for them, too.

The plan proposed here is, I believe, the next measure of imperative need in Egypt if great progress is to be made at a single step. Should this attempt prove successful, it might be of far-reaching importance from the medical, social, and economic points of view, which I need not enlarge upon here.

This experiment, however, is not only of importance for ophthalmias, but indirectly also for trachoma*.

From several Egyptian oculists I have learned of the following observation—I do not know whether it has been published in medical literature. If a man with thoroughly healthy eyes, as the oculist has ascertained by an earlier examination, reports to him for an acute ophthalmia, it frequently happens that he is found to have a trachoma after the ophthalmia has been cured. From this the conclusion is drawn that the virus of the trachoma is communicated along with the germs of the ophthalmia.

Hence it would seem very probable that in a good many cases trachoma is not simply communicated as trachoma from man to man, but affects the eye in the form of a powerful infection associated with the germs of the ophthalmia. Trachoma escapes identification on account of the severe purulent inflammation, and is not readily recognized later on, because the remaining papillary hy-

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* Sédan published the following interesting observation: In spite of great untidiness the three children of a trachoma patient remained free from trachoma many years, until the father acquired an acute diplobacillary conjunctivitis. Then all the children became infected with trachoma.

pertrophy is considered due to the gonorrheal or Koch-Weeks conjunctivitis. Only at a relatively late period can such a trachoma be diagnosed by the presence of pannus and scars.

Thus the campaign against the flies would perhaps not only obviate the ophthalmias but also attack a possibly very frequent cause of trachoma*.

Parallel with the attempt to combat the fly in a village, bacteriological researches ought to be made on a rather larger scale in an effort to study flies as germ carriers†. The examination of the feet of the flies for the presence of secretion and germs; the influence which the temperature of the air and the huts, solar radiation, and time, exert on the vitality of the various germs; the significance for the vitality of the germs of clots of secretion sticking to the feet of the flies; and a great number of similar questions would be sure to prove of great practical interest.

In this way it might be possible to throw more light on these questions, to prove conclusively that flies are carriers of infectious germs, and to prepare a better basis for the campaign against the fly. My opinion is that along this line lies the possibility of a great step forward.

Skodagasse 13.

* A percentage of 0.28 of the whole population was found to be affected with acute ophthalmia in the eye infirmaries.

† I have the impression that somebody found pathogenic germs on the feet of flies which had been caught on an eyelid with purulent conjunctivitis, but I was unable to find the quotation in the literature.

A CASE OF CORNEAL CALCIFICATION (BAND-SHAPED KERATITIS) WITH CONJUNCTIVAL CHANGES

FRANK B. WALSH, M.D., F.R.C.S. (ED.) AND EUGENE CHAN, M.D.
BALTIMORE

This case occurred in a white youth, the child of a consanguineous marriage. The pearly, thickened conjunctiva extending down upon the cornea is a feature which a search of the literature proved to be unique. From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital.

Cases of calcareous degeneration of the cornea are sufficiently infrequent to be of interest. The description of the condition by Bowman[1] has had but little added to it since that time. Recently we have seen a case with marked conjunctival changes, and as a search of the literature has not resulted in our finding a similar one, we venture to present it.

Case Report

H.H., white, aged 18 years, came to the Wilmer Dispensary complaining of defective vision in both eyes. Because of this visual deficiency he had left school at 12 or 13 years of age, and since then had had no occupation.

Family History: The patient's mother is married to her uncle. He is the only child of this union. There is no other history of intermarriage in the family for three generations.

Past History: He had pneumonia during infancy, a tonsillectomy six years ago, and a herniotomy four years ago. For the past year he has had an eruption of the face. The right ear has discharged occasionally since childhood. During the past two years he has lost ten pounds in weight.

Ophthalmological History: At eleven years of age he complained of a sticky sensation in the right eye, at which time his mother states she noticed a white spot at the center of the cornea. The vision diminished rapidly. Two years later a similar condition occurred in the left eye. At that time he was taken out of school. There is no history of pain in the eyes at any time.

Physical Examination: General examination revealed a poorly developed, poorly nourished, unintelligent white boy, 94 pounds in weight, having an unusual facial appearance. There were several carious teeth, shotty left axillary glands, some postnasal discharge, slight enlargement of the thyroid, a narrow asthenic type of chest with flaring of the lower ribs anteriorly, and a depression of the lower part of the sternum. There was a Dupuytren's contracture of the little and ring fingers of each hand. Acne vulgaris was present on the face and trunk. A psychiatric consultant classified him as feebleminded with no outstanding abnormality in personality traits.

Laboratory Tests: There were no unusual findings. The blood chemistry showed sugar 100 mgm. percent; uric acid 3.2 mgm. percent; cholesterol 275 mgm. percent; nonprotein nitrogen 36 mgm. percent; and calcium 10.7 mgm. percent. Wassermann reaction was negative. Tuberculin test was positive to 1/10 gm.

Ophthalmological Examination: O.D. —The lids were normal. The bulbar conjunctiva and cornea were quite conspicuous. The conjunctiva was thickened and had a pearly, glistening white color. It extended onto the cornea from above in the form of fingerlike processes, overlapping the corneal margin and not attached at the periphery. The conjunctiva immediately above the limbus had the dimpled appearance seen after some trephine operations. There was a dull, white, opaque band with irregular edges extending transversely across the cornea and stopping just short of the limbus. The greater part of it was below the equator. The anterior chamber was shallow. The iris was atrophic with anterior synechiae. The pupil was not seen. The tension was below normal to the fingers. Transillumination was not unusual. The fundus could not be seen with an ophthalmoscope.

O.S.—The conjunctiva was similar to

that of the right eye, but the corneal opacity was round and centrally placed. There was a white mass below the leucoma, which was adherent to the posterior surface of the cornea and almost filled the pupillary space. The pupil was irregular and fixed. The iris had uveal ectropia, particularly noticeable on its nasal side. The tension was normal to fingers. The fundus could not be seen with an ophthalmoscope.

that in the right eye. The corneal opacity centrally placed was more dense and circular. It was at the same depth in the cornea. There were anterior synechiae. The pupil was irregular with marked pigmentary change at the pupillary border. A white mass almost filled the pupillary space. There were no posterior deposits.

Vision: O.D. = hand movements at 2 ft.; O.S. = 3/200.

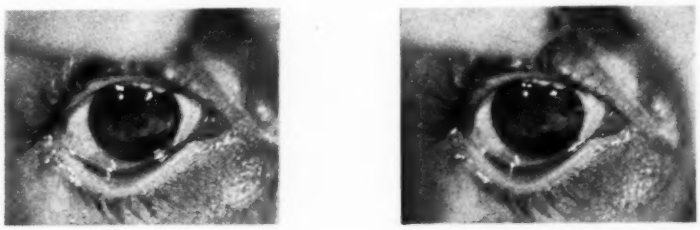

Fig. 1 (Walsh and Chan). Stereoscopic photograph of right eye.

Slitlamp: O.D.—Tiny conjunctival vessels were seen extending to the fingerlike processes, but not along them. The dimpled or stippled conjunctiva above the limbus merged into smooth, white conjunctiva behind. The transverse corneal band was a white opacity situated just below the epithelial layer, which appeared to be intact. The edges were serrated. The opaque substance extended to the level of Bowman's membrane and in several areas below it through the greater part of the thickness of the stroma. There were several outlying areas of slight opacity just below the epithelium. There were no deposits on the posterior surface of the cornea. The iris was atrophied and radially placed vessels were seen. The anterior chamber was shallow.

O.S.—The conjunctiva was similar to

Discussion

Band-shaped keratitis is probably the most frequently used term to describe the corneal condition here depicted. Other designations, such as calcification of Bowman's membrane, ribbon-shaped opacity, chalk-band, etc., are less often used. Band-shaped keratitis is usually a misnomer, as an actual inflammation of the cornea has not been demonstrated in the majority of cases.

These cases may be divided into three groups: (1) primary, (2) secondary, and (3) traumatic. The primary form generally occurs in old people. Its real cause is not known. It is inferred that it is due to a nutritional defect of the cornea. Lewis[2], among others, has likened these structural changes to those found in the elastic tissue of vessels in arteriosclerosis. The secondary form,

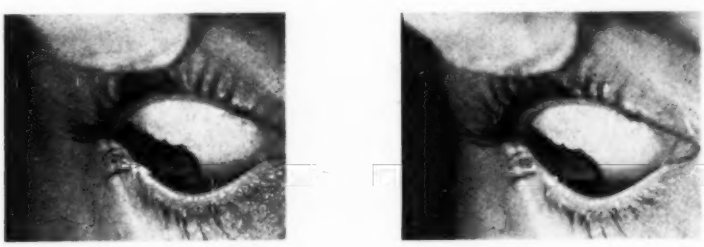

Fig. 2 (Walsh and Chan). Stereoscopic photograph of right eye; another view.

which is much more common than either of the other two forms, is most frequently observed following chronic inflammation, often chronic iridocyclitis. Hence it may be seen at any age. We have lately studied a case of this type in a colored girl, seven years of age, with congenital cataracts, and in a man of fifty-six years with glaucoma and choroiditis. The traumatic form has been reported following exposure to irritants, such as mercury vapor[5], calcium bichromate[4], and calomel[6] used as a dusting powder. Topolanski[6] saw this kind of opacity in hatters, into whose eyes particles of hairs were constantly flying from the hares' skins that they were engaged in cutting.

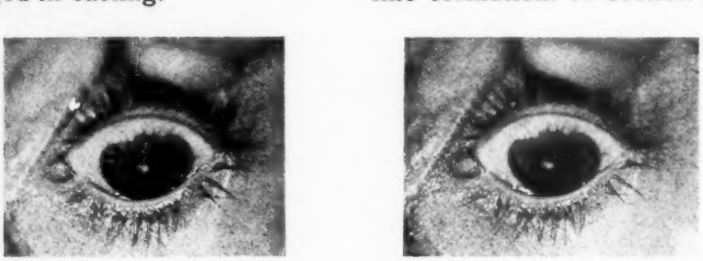

Fig. 3 (Walsh and Chan). Stereoscopic photograph of left eye.

The opacities gradually developed from two points just inside the nasal and temporal edges of the cornea and always lie within the interpalpebral space. They extend across the cornea and finally meet about the center. The situation of the opaque material is below the epithelial layer, reaching Bowman's membrane and breaking it up. In places the membrane may be seen to have disappeared. The opacity may reach a considerable depth in the corneal stroma. Such an opacity is probably preceded by the formation of hyaline. There is ultimately a deposit of calcium carbonate or phosphate. Gifford[7] considers hyaline degeneration and the so-called bandlike opacity of the cornea to be related histologically, microchemically, and etiologically. Tooke[8] believes that lime salts may be deposited with or without hyaline degeneration.

In the secondary form there may be an actual extrusion of these calcareous particles through the epithelial layer. Glaucoma may be a sequel as well as a causative factor. In the late stages giant cells may be visible as evidence of foreign-body reaction.

Although there are no visible changes in Descemet's membrane, Fischer[9] has suggested that a change in this membrane allows a greater amount of aqueous to pass through the stroma of the cornea, and as the epithelial layer is impervious, the salts are deposited just behind that layer.

The unusual feature of our case is the accompanying conjunctival affection. The thickened, white conjunctiva bulging over the cornea suggests hyaline formation. A section of the conjunctiva was reported as indicating hyaline degeneration of the subepithelial connective tissue. Unfortunately, it was impossible to obtain a sufficient amount for chemical tests.

Confusion exists in distinguishing between hyaline and amyloid degeneration. Although amyloid is hyaline, it has characteristic microchemical properties. At times both conditions may exist together. MacCallum[10], however, states that the term hyaline degeneration is "loosely employed to class together, in the present state of our ignorance, a great many unrelated substances, usually recognizable only with the microscope, which have in common, besides their protein nature, only their translucent clear or hyaline appearance and their tendency to stain brightly with such acid dyes as eosin." Amyloid is a true infiltration between the cells as distinguished from hyaline, which is developed in the cell itself. In cases of amyloid infiltration the cell is destroyed

by pressure; in hyaline masses the cell has degenerated.

The actual causation of both is unknown. We do know that amyloid occurs most often in the spleen, liver, and lymph gland, but that every tissue may be affected. Hyaline is seen frequently in blood vessels, muscles, and connective tissue. Raehlmann[11] concludes that amyloid can form only from hyaline degenerative tissue. Kubli[12] visualizes four phases of development—adenoid proliferation in subconjunctival tissue, hyaline degeneration, amyloid degeneration, and finally calcification and ossification. Kamocki[13] and Vossius[14] believe that although similar, they are of independent development.

Both amyloid deposits and hyaline degeneration may be manifested in the conjunctiva. Usually they are the result of a local process, such as trachoma. Amyloid rarely occurs as a consequence of lardaceous disease. Many cases are described in connection with trachoma (Lagleyze[15], Kubik[16], Santonastaso[17], de Poppen[18], and others) and in these, plasma cells are repeatedly noted. Seefelder and Berger[19] have reported cases of vernal catarrh associated with hyaline degeneration of the conjunctiva. Csapody[20] has recorded a case of hyaline degeneration of the bulbar conjunctiva, which had severe iridocyclitis following cataract operation.

Besides the conjunctival changes, our case has a central, round opacity in the left cornea, the depth of which corresponds to that in the other eye. The corneal opacity in the right eye is a typical band-shaped lesion.

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RECURRENT EDEMA OF THE LIDS AND CONJUNCTIVA ASSOCIATED WITH DENTAL INFECTION

Report of two cases

HUNTER SCARLETT, M.D.
PHILADELPHIA

In two cases, recurrent swelling of the upper lids and conjunctiva in adults disappeared when dental infection was removed, cultures from the extracted roots demonstrating the presence of hemolytic streptococci. The author concludes that palpebral edema may result from sensitization to bacterial protein.

Recurrent or angioneurotic edema of the lids and conjunctiva was formerly considered by most authors as probably due to a vasomotor neurosis, but some later investigators have thought it more likely to be due to certain toxic or allergic changes in the body that lead to increased attraction for water by the tissues.

According to de Schweinitz[1] the lids are sometimes the seat of a recurrent or fugitive type of edema, manifesting itself in general conditions of a cardiac and renal nature. This type of edema may also be present in migraine; at the time of the establishment of menstruation; and may even occur spontaneously without apparent cause.

Fuchs[2] describes recurrent neurotic edema of the lids as a marked swelling usually free from redness, making its appearance suddenly, then rapidly disappearing, often within a few hours. He says that these transient attacks of edema are due to a temporary disturbance in the innervation of the vessels and are allied to urticaria. They occur most frequently in women at the time of their menses.

Beach[3] in 1924 reported two cases of edema of the lids, the first of which was associated with para-typhoid. The edema in this instance was ascribed to an increase in the permeability of the blood vessels similar to that seen in glomerulonephritis. The patient in the second case, one of edema fugax, had had recurrent attacks for years, which were thought to be due to allergy.

Since new sources of foreign-protein absorption have been found, the proportion of cases of angioneurotic edema and allied conditions ascribed to anaphylaxis has increased, while those considered in the light of a neurosis have decreased. Not only have more reactions to food been observed, but also more avenues of absorption of bacteria and their products have been recognized.

Rotch[4] treated a patient suffering with an angioneurotic edema of the lids which followed the eating of an egg. The edema was accompanied by corrugation of the conjunctiva.

Barber[5] believes that in adults, sensitization producing recurrent edema is more likely to arise from bacterial rather than food protein. He says that the focal infections causing skin reactions are frequently in the tonsils, sinuses, or appendix.

Foster[6] quotes Beard as stating that teeth may cause edema before the dental infection is recognized.

Rotch[7] in 1903 reported a case of recurrent edema appearing in a susceptible patient during eruption of canine teeth.

Beach[8] reported two cases of typhoid with transitory edema. There was a positive Widal in each case plus the presence of typhoid bacilli in the stools of the second one. Edema under ordinary conditions would not have been suspected as being associated with typhoid because it appeared early and disappeared before the disease was actually diagnosed by laboratory methods.

Although these cases of intermittent edema constitute a distinct clinical group, their connection with one another is not always clearly defined. Those having protein as an etiological source may be included under anaphylaxis, many of which cases are constantly being observed. On the other hand,

there are numerous instances in which protein cannot be found to be the underlying cause, as in migraine and menstruation.

According to Beach[8], histamine, the result of incomplete protein hydrolysis, which is present in intestinal auto-intoxication, is able to produce many of the phenomena of allergy. There probably exist two distinct factors in its production, namely, a hypersusceptibility and a reflex disturbance.

It is unsettled whether wheals following the injection of certain drugs and bites are the results of a toxic or of an allergic action. The behavior of internal secretions is also not clear, as thyroid substance can produce edema under certain conditions. Thompson[9] believes that edema follows a circulatory disturbance rather than that it is a direct reaction of the tissues to the hormone. Thus far, little is positive except that edema of the lids may occur in hyper- and hypothyroidism. Leopold Levi[10] says that edema due to thyroid conditions may take the form of "pouches" of the lids. They are acute, transitory, or chronic, and disappear under thyroid treatment.

As to the pathology of edema of the lids, Weidler[11] in three cases attributed the swelling to toxins elaborated by bacteria in the nose, and absorbed by the lymphatics of the skin. Others think that obstruction of the lymphatics by thrombi of bacteria or pressure from organized tissue is not likely to develop and then vanish so rapidly and completely. Many recent writers believe the condition always originates from a nasal infection. While the nose may frequently be the etiological seat, this does not rule out other foci in the body, especially the teeth. Some other predisposing factor, as a weakness of the defense mechanism of the tissues, also seems essential.

Boycott[12] demonstrated that edema did not result from venous obstruction alone, but occurred only after nutrition of the tissues had been impaired.

Theoretically, treatment should be aimed toward increasing the general immunity. In those patients with dental or nasal infection, local measures will undoubtedly help the present attack, but will not be a guarantee against future ones.

Case 1. A. J. S., aged 65 years, came under my care on April 16, 1923, because of a marked swelling of both upper lids and conjunctiva of one day's duration. He said that during the preceding week he had had daily attacks which lasted six or seven hours, when they would disappear to return again the next day. X-ray films of his teeth showed several abscessed roots in the upper and lower jaws. There was marked pyorrhea of both gums. The abscessed teeth were extracted, and pyorrhea was treated. Immediately afterwards the edema disappeared and did not return. Culture of the roots at the time of extraction showed the presence of streptococcus hemolyticus.

Case 2. C. B. M., aged 70 years, was first observed October 5, 1932, giving a history of recurrent swelling of the upper lids with remissions, during the past two weeks. Examination showed an edema with a slight redness of the upper lids and conjunctiva, more marked toward the nose.

This patient had a devitalized left upper bicuspid tooth, which had been capped, also the first right upper molar showed infection about the root. Associated with the defective teeth was a general pyorrheal condition. Both teeth were extracted and the pyorrhea was vigorously treated. The day after the teeth were extracted the edema was much less marked and had entirely disappeared within three days. Two slight recurrences were observed during the following two weeks while the pyorrhea was being treated but none since then. A culture from the roots of the extracted teeth revealed streptococcus hemolyticus.

Summary and Comment. Two cases of recurrent edema of the lids gave distinct evidence of pyogenic infection about the roots of one or more teeth and pyorrheal involvement of the gums. The infection was corroborated by culture of streptococcus hemolyticus at the time of extraction of teeth, thus indicating the presence of bacterial protein in these patients.

It has been stated that, especially in adults, bacterial protein is more prone than food to produce sensitization resulting in recurrent edema. We then have in these two cases both essential requirements for bacterial allergy; namely, the bacterial protein and the suitable ages, for my patients were 65, and 70 years old, respectively. Given a patient of proper age, plus a focus of infection of sufficient virulence, it can readily be imagined how a bacterial allergy may follow.

230 South Twenty-first Street.

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PARADOXICAL IMAGES IN VERTICAL-RECTUS PALSIES

Report of two cases

MAXWELL FIELDS, M.D.
LOS ANGELES

Two cases are reported in both of which a severe blow was received over the eye. Diplopia with paradoxical position of false images developed, which in one case disappeared spontaneously but in the other persisted. The author discusses the mechanism of this phenomenon, establishing it as associated only with vertical-rectus-muscle paresis. Read before the Los Angeles Ophthalmological and Otolaryngological Society, March 27, 1933.

The purpose of this report is to call attention to an unusual phenomenon occasionally observed in palsies of the vertical-rectus muscles, which, when encountered, leads to confusion in the interpretation of the findings of an otherwise typical case. An attempt at an explanation of this phenomenon is, therefore, not only of theoretical interest but also of practical value in diagnosis of ocular palsies. A review of the literature including such comprehensive works on the subject as Duane, Worth, Peters and others fails to reveal any mention of it.

Case reports

Case 1. The patient, R.F., a white male, aged 32 years, a truck driver, was thrown from his truck in an accident on December 20, 1931, and suffered incidentally a severe blow over the left eye. The past history was irrelevant. Physical findings showed a marked swelling and ecchymosis of the lids with the eyelids completely shut. There was a massive hemorrhage beneath the bulbar conjunctiva with no white sclera visible. X-ray examination revealed no fracture, and the blood Wassermann was negative. A few days later when the swelling had subsided and the patient was able to open his eye, he complained of double vision. There was a definite limitation of elevation of the eye. All other ocular movements were normal. Fundus examination, which had now become possible, was negative. Refraction under homatropine showed that in each eye, with —0.50 D. sph. + 1.00 D. cyl. axis 180°, vision equaled 20/20. The patient described the picture of double images shown in fig. 1 which was reduced to single vision with three

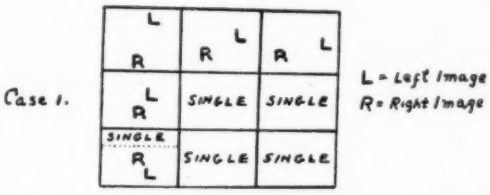

Fig. 1 (Fields). Illustrating the reversal of images in case 1.

degrees of prism divided equally, base up, before the left eye and base down before the right eye. (Note: Seven months later the diplopia disappeared spontaneously and prisms were no longer necessary.)

Case 2. This case has been added after the original report to the local society. The patient was seen in April, 1933, in consultation with Dr. Glassman who made the diagnosis. The patient, B.A., a white male, aged 30 years, also gave a history of a severe blow over the right eye in February, 1933, and showed at that time marked swelling and discoloration of the eyelids and double vision, which has persisted up to the present time. Limitation of upward movement of the eye was definitely present. Downward movement was normal. The diplopia picture which this patient presented is shown in fig. 2.

Case 1 is typical for a left-superior-rectus, and case 2 for a right-superior-rectus involvement with the exception of a peculiar transposition of images in the lower field after passing a point where single vision occurred. At first glance one would be led to believe that one was dealing with none other than a multiple-muscle palsy consisting of both an elevator- and depressor-muscle involvement, in the same eye. That such is not the case, however, is evidenced

Case 2.

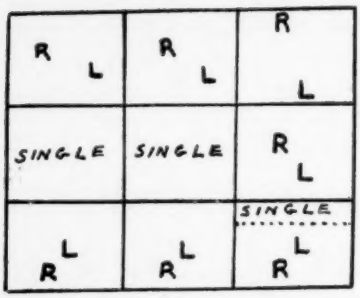

Fig. 2 (Fields). The relative position of images in case 2.

by the fact that in the first case the changed position of images is limited to the field on the left, single vision obtaining in the other fields. If this phenomenon were due to an associated depressor paresis one should expect at least a diminishing diplopia in the midline. In the second case this finding is present in all three fields but it will be observed that the amount of separation of images is *constant*, there being *no increase* in displacement of images in the field of the paretic muscle. The most conclusive proof against multiple-muscle palsy, however, is the therapeutic test with prisms. If we insert a prism, base up, before the left eye to overcome the diplopia due to the elevator palsy we shall find that the reversal of images in the lower field diminishes in amount or vanishes entirely. This would certainly not happen if the diplopia were due to a depressor paresis, in which case we would, on the contrary, get an increase in the separation of the images due to the prism, base up. The phenomenon, then, is an essential part of the superior-rectus involvement.

What is the explanation of this paradoxical position of the images? In the first place, this phenomenon will occur only in muscles having a torsion component; in other words, only in vertical-muscle palsies. Of the vertical-muscle palsies it will occur only in those of a rectus and not in those of an oblique for reasons which will be made obvious later. Furthermore, it is most apt to occur in that type of vertical-rectus case in which the paralysis is incomplete or weak, in which the torsion component of the antagonist is particularly strong and in which the angle gamma between the visual axis and the axis of rotation is prominent.

Let us take the first case for illustration. The paralyzed muscle, the left superior rectus, has an intorsion component. Its antagonist, the left inferior rectus, has an extorsion component. The former being paralyzed, the eyeball is thus pulled into extorsion, which, stated in other words, means that the upper pole of the globe is tilted temporally. We know that this axis of torsion which runs from anterior to posterior pole does not correspond with the visual axis but that there is an angle gamma between the two. We know further that the macula is placed at the posterior end of the visual axis and lies temporal to the posterior pole. If we now visualize the fundus of the left eye we can see what happens to the position of the macula during the act of rotation.

In the primary position the optic disc and macula are for diagrammatic purposes placed on the same level with the posterior pole of the eye. In intorsion, it will be observed, the macula is elevated and in extorsion, as in this case, the macula is depressed in level by virtue of the fact that it lies not on the axis of torsion, but temporal to it. From the laws of vision and projection we know that the image of any object that previously fell on the macula of this retina will strike the retina above the macula and the object will therefore be projected below its true position in space. Hence we see in this case a transposition of the false image from above to below the true image, or to what is termed a paradoxical position of the false image.

It may now appear obvious why this phenomenon cannot occur in an oblique palsy. Let us take for example the other elevator in this left eye; namely, the left inferior oblique. It so happens that this elevator, unlike the superior rectus, has an extorsional component. Hence if it were paralyzed, the superior oblique, its antagonist, which has an intorsional component, would pull the

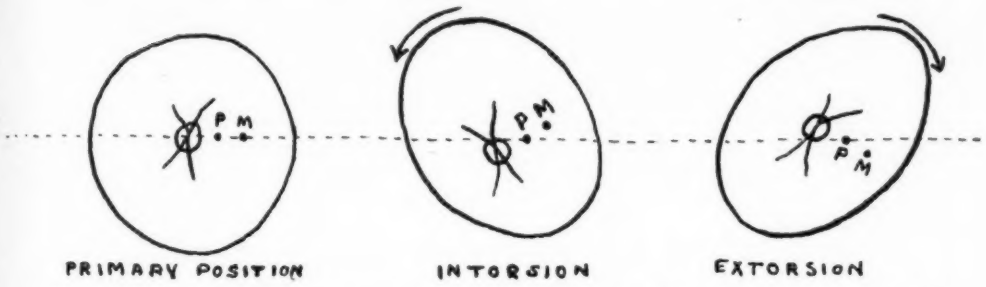

Fig. 3 (Fields). Schematic drawing illustrating the basis of the phenomenon of paradoxical false images as due to vertical-rectus palsies.

eye into intorsion. As we have seen above, the macula in intorsion is rotated upward and the image of an object would fall on the retina below the macula and be projected above. This is the position in which the false image in an elevator-muscle paresis already finds itself and therefore there is no such transposition of images.

In other words, what happens in all cases of vertical-muscle palsies, is that the torsional component of the antagonist introduces a secondary element of vertical separation of images. In the case of a rectus muscle this separation happens to be in a direction opposite to that of the primary separation of images caused by the paralyzed muscle itself and thus always acts as a counteracting force to the latter. When this rotation component is particularly powerful, or the paralysis of the rectus is incomplete or slight, and the angle gamma is normal or prominent, this counteracting factor finally overbalances the primary separation in the field of least activity of the paralyzed muscle or in the field of greatest activity of its antagonist and the phenomenon of paradoxical position of images occurs. In the case of the obliques this secondary vertical separation of images due to the torsion of the antagonist happens to be in the same direction as the primary separation and hence always acts as an augmenting force to the latter. Paradoxical images are therefore never possible in the case of paresis of the obliques.

Conclusions

1. Paradoxical position of the false image may be considered a pathognomonic sign of vertical-rectus palsy, and as an index of the degree of paralysis.

2. The same factor which in a rectus paresis tends to diminish the diplopia or bring about a paradoxical position of the false image, acts to augment the diplopia of an oblique palsy.

3. This phenomenon, which should be sought more frequently, is differentiated from a multiple-muscle palsy by the test with prisms.

1050 Roosevelt Building.

NOTES, CASES, INSTRUMENTS

TREATMENT OF TRAUMATIC CATATROPIA

Major FREDERIC H. THORNE, M.D., F.A.C.S.
CRISTOBAL, C.Z.

Mr. E. R., aged 43 years, was injured in January, 1926, by the explosion of a priming cap. A portion of the copper jacket pierced the right upper lid, near the inner canthus, entered the orbit and lodged near the optic nerve.

On the fourth day following the accident a slight infection developed in the wound. An attempt was made immediately to extract the foreign body. The attempt was unsuccessful and another was made the following day under ether anesthesia. This attempt was unsuccessful as well and during the operation the superior rectus and the levator muscle of the lid were injured or completely severed. Three subsequent attempts were made to extract the foreign body, but each ended in failure. The infection subsided in a few days.

During the following few months two operations were performed on the upper lid, for correction of the ptosis, and one on the inferior rectus muscle for relief of the existing catatropia. Eventually prisms were prescribed, beginning with a strength of two diopters. The strength of these was increased until diplopia was overcome.

The patient came under the observation of the writer in 1932, at which time he presented the following: a marked ptosis of the right upper lid, twenty-seven diopters catatropia, right, faint central opacity of the posterior lens capsule, left. The fusion sense was normal. He was wearing the following correction: O.D. + 1.00 cyl. ax. 90° ⌯ 12 diopter prism base up; vision was 20/50 + 3; O.S. + 1.00 D. sph. ⌯ + 0.25 cyl. ax. 115° ⌯ 12 diopter prism base down, vision 20/30 — 1.

Without correction a vertical diplopia was present. The patient, however, stated that upon arising in the morning binocular single vision could be maintained for a short time. Then tilting of the head backward was necessary to maintain such vision. After a short time binocular single vision could not be attained in any case. Binocular single vision, without correction, was not found at any time by the writer.

Ocular movements of the left eye were normal. The movements of the right eye were normal except in the field of the principal action of the superior rectus. Fixation with this eye could be maintained horizontally, with head erect, but this required conscious effort. Comfortable fixation, with head erect could be maintained without conscious effort at four degrees below the horizontal or primary position. With considerable effort fixation could be raised eight degrees above the horizontal giving a range, from comfortable fixation to the extreme upper limit, of twelve degrees.

Greater effort than normal was required to accomplish the limited vertical rotation of the right eye. The nervous energy being equally distributed between the two superior recti muscles resulted in an excessive vertical rotation of the left eye, while maintaining the right eye at comfortable fixation.

The patient objected to wearing prisms and was extremely anxious to have his ocular defects corrected. The loss of action of the superior rectus and the levator palpebral muscles, together with the surgery already performed, made further efforts to raise the globe, surgically, inadvisable; there seemed to be little or nothing upon which to work. However, after a study of his ocular movements an improvement, at least, seemed possible.

The factors considered as being in favor of improvement were: (a) his comfortable fixation point of four degrees below the horizontal; (b) the ability to fix eight degrees above the horizontal (range of twelve degrees); (c) the strong fusion sense; (d) the ability to attain binocular single vision, without correction, upon arising in the morning.

If the action of the sound superior rectus were weakened, less vertical rotation would occur with the same innervation. It should then be possible for fusion to bridge the gap remaining between the visual lines, making binocular single vision possible, in so far as the defective eye could be rotated.

A fascia lata hammock-operation was performed on the right upper lid for correction of the ptosis. The lid was elevated until its palpebral margin crossed the cornea in the same position as that of the left with the eyes open in the primary position. Because of the twenty-seven diopters of catatropia, this level left the lid slightly lower than its fellow. This surgical correction was successful.

The eyes were then refracted under homatropine and the following correction prescribed: O.D. + 0.25 D. sph. ⊂⊃ + 1.00 cyl. ax. 115°, vision was 20/20; O.S. + 0.50 D. sph. ⊂⊃ + 0.50 cyl. ax. 180°, vision was 20/20 — 4.

Seven months after correction of the ptosis a 5 mm. recession of the left superior rectus muscle was performed. The eyes were covered for four days. Dressings were then removed and the above correction worn constantly. Conjunctival sutures were removed on the fifth day and the recession sutures on the eighth day.

Prisms have not been worn since the operation. Binocular fixation is comfortable in the primary position and can be maintained, for a time, eight degrees above this point. When gazing higher the head must be tilted to maintain binocular single vision. There has been no discomfort and the results are entirely satisfactory to the patient. The foreign body, the primary cause of all his trouble, remains in the orbit but causes no symptoms.

Colon Hospital.

ARTERIOVENOUS ANEURYSM RESULTING FROM PECULIAR EYE ACCIDENT

EDWIN B. DUNPHY, M.D.
BOSTON

Mr. E. M. a farmer, aged thirty-five years, was first seen by me on October 6, 1932. One month previously a three-tined haying-fork fell from a hay rick just as the patient looked up, and one of the tines entered the right orbit at the outer canthus. There was a gush of blood and considerable pain. He fainted and was taken to a local hospital, where the conjunctival wound was sutured. The following day the eye protruded considerably. This protrusion increased daily and in about one week the patient was conscious of a blowing noise in his ears, present only when he assumed a recumbent position. He was never able to see with the eye after the accident.

Examination showed a greatly proptosed eye with a corneal ulceration from lagophthalmus. No pulsation was felt. There was a great mass of chemotic conjunctiva protruding from below the globe. Ocular motions were abolished. The pupil was dilated and fixed. The fundus showed a dirty-white atrophic disc with blurred margins; the retinal veins were dilated; vision was nil. X-rays of orbit and sinuses were entirely negative. A loud bruit was heard all over the head. This could be stopped by pressure over the right carotid artery. A diagnosis of arteriovenous aneurysm was made.

The tine of the haying fork must have entered the orbit at the outer canthus, traveled along its outer wall, passed through the great sphenoidal fissure, and then penetrated the cavernous sinus and internal carotid artery. It was extraordinary that the direction of the tine should have conformed so closely to the slope of the outer orbital wall that this was not fractured. The optic nerve was undoubtedly injured at the apex of the orbit thus accounting for the immediate loss of vision.

An attempt was made to ligate the internal carotid artery, but due to the patient's condition under the anesthetic, had to be given up. The eyeball had to be removed because of the necrotic cornea and for cosmetic reasons. Following enucleation, a brisk hemorrhage occurred, which was easily controlled by packing the cavity and making pressure. After all dressings were removed there was an unsightly mass of

edematous conjunctiva protruding between the lids, making insertion of an artificial eye impossible. After six months this had largely disappeared, so that the patient could wear a glass eye with satisfaction. No further attempt was made to ligate the internal carotid as pressure over this region caused numbness in the hands and fainting spells.

520 Commonwealth Avenue.

IMPROVED MADDOX ROD TEST

WENDELL L. HUGHES, M.D.
HEMPSTEAD, L.I., N.Y.

In using the Maddox Rod the usual procedure is to place a white or pink rod before one eye and ask the patient the relative positions of the streak and the light. If there are any stray sources of light in the room the patient is frequently confused as he may see more than one streak. This always necessitates having the streak properly identified.

If a small unfrosted green glass bulb* is placed opposite the aperture in the muscle-light chimney and a red filter placed over one eye with a white Maddox Rod over the other, a very advantageous and definite combination is obtained, namely; a red light and a green line. As the green color is obtained from the object there are no no other green lines to confuse the patient. Any stray light in the room gives white streaks. This renders the test very simple for the patient as there is nothing to confuse him. For this reason it saves time for the examiner and is in addition more reliable, as the patient always tells the examiner immediately about the relative positions of the green line and red light without preliminary explaining as to which is the proper line.

*This bulb is made in a candelabra screw base by the General Electric Co. 6 watt, 120 volt, S-6 natural green. An adapter may be used if one is at present using a white bulb with the regular size base.

If there is a frosted glass over the aperture in the muscle-light chimney, it should be removed. The best aperture with the colored light at 20 feet is one about 8 mm. in diameter. This gives a brilliant green line which can be seen in a well lighted room. This technic is especially useful for momentary uncovering of the Maddox rod.

Professional Building.

A STEEL FRAGMENT REMOVED FROM THE ANTERIOR CHAMBER TWENTY-ONE YEARS AFTER INJURY

M. N. BEIGELMAN, M.D.
LOS ANGELES

On July 8, 1932, Mr. I. L. came to my office complaining of pain in the right eye. Twenty-one years ago, while working, he had had a penetrating injury to this eye. He had lost vision in this eye, at once, but it remained comfortable until a few days before he came to the office. On examination the right eyeball was found to be totally blind, congested and tender. The cornea of this eye had a central leucoma of a yellowish rusty appearance about 4 mm. in diameter. Through the transparent peripheral part of the cornea an oblong mass about 2 mm. by 5 mm., partly attached to the posterior surface of the cornea, was seen in the anterior chamber. The iris appeared to be atrophied. An x-ray revealed a foreign body in the anterior chamber of the right eyeball. On December 14, 1932, under a deep orbital anesthesia, an incision was made with a Graefe knife in the lower half of the limbus. A flat spoon was introduced back of the foreign body so as to prevent it from falling into the vitreous in case it were crushed into particles. The foreign body was then caught with a nasal forceps and extracted. The healing was uneventful. The foreign body was a piece of steel about 1 mm. × 2.5 mm. in size. weighing 0.025 gm.

1930 Wilshire Boulevard.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 23, 1933

Dr. Dean Godwin presiding

Dye dermato-ophthalmitis

Dr. Clyde Harner stated that Lashlure, an eyelash dye, was made in Los Angeles by a company headed by a graduate in medicine. It contained an aniline dye, but not paraphenylenediamine. Recently many cases of poison due to Lash-lure had been reported in the Journal of the American Medical Association. He had seen three such cases. The first was that of a girl 23 years of age, who had had her lashes dyed with the preparation. There was swelling of the lids and a vesicular eruption on the skin the following day. The swelling was very marked and there was also chemosis of the conjunctiva. The cornea was uninvolved. Improvement was slow, with the formation of a marginal lid abscess. Four years later this same patient had her lashes dyed again, with a second attack of inflammation which lasted six weeks before the lids returned to normal. A second patient developed a similar inflammation after the use of a dye and was found to have a positive Wassermann reaction at examination. This patient developed ulcers of the cornea and a uveitis with resultant permanent corneal scars. In addition to local treatment intravenous typhoid vaccine was used. The third patient had a milder course with complete clearing of the condition in one week. Locally, adrenalin and magnesium sulphate packs seemed to give the most relief. Because adrenalin gave the most relief Dr. Harner considered the reaction might be of an allergic nature.

Discussion. Dr. Eugene Lewis thought these individuals must have an inherent factor which made them react in such a severe manner to the dye. In the patient with the positive Wassermann reaction he felt sure that spirochetal activity was responsible for the severity of the process.

Dr. George Piness said that the reaction might be considered allergic in the broad sense of an altered reaction to a foreign substance, but that most allergists would call it a chemical poisoning as there was no protein in the dye and protein was necessary for the production of a true allergic reaction. This dye was also used on furs and produced irritation of the skin in susceptible individuals when such furs were worn. Medical men should have a better knowledge of the contents of cosmetics as many of them contained irritating substances.

Dr. Smith inquired whether the patients affected were blondes or brunettes.

Dr. Harner concluded by stating that he believed Dr. Lewis to be correct in assuming that the second case was complicated by a syphilitic infection. Two of the patients were blondes and one was a brunette.

Retrobulbar abscess

Dr. Owen Homme presented a ten-year-old boy, who had come to the clinic because of a swelling in the right temporal region and protrusion of the right eye. The right tympanic membrane was found to be bulging and the next day there was fluctuation in the right zygomatico-temporal region. The right eye was proptosed. Although the x-rays showed no definite mastoid infection operation was done and yellow pus was encountered upon dissecting forward under the periosteum of the temporal bone. An anterior incision was made for drainage. On the first postoperative day the blood cultures showed staphylococcus aureus. There was gradual improvement and lessening of the proptosis. One month after discharge from the hospital the right eye again began to swell while the globe was pushed downward and inward. Dr. Boyce made a Krönlein incision and

edematous conjunctiva protruding between the lids, making insertion of an artificial eye impossible. After six months this had largely disappeared, so that the patient could wear a glass eye with satisfaction. No further attempt was made to ligate the internal carotid as pressure over this region caused numbness in the hands and fainting spells.

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Dr. Harner concluded by stating that he believed Dr. Lewis to be correct in assuming that the second case was complicated by a syphilitic infection. Two of the patients were blondes and one was a brunette.

Retrobulbar abscess

Dr. Owen Homme presented a ten-year-old boy, who had come to the clinic because of a swelling in the right temporal region and protrusion of the right eye. The right tympanic membrane was found to be bulging and the next day there was fluctuation in the right zygomatico-temporal region. The right eye was proptosed. Although the x-rays showed no definite mastoid infection operation was done and yellow pus was encountered upon dissecting forward under the periosteum of the temporal bone. An anterior incision was made for drainage. On the first postoperative day the blood cultures showed staphylococcus aureus. There was gradual improvement and lessening of the proptosis. One month after discharge from the hospital the right eye again began to swell while the globe was pushed downward and inward. Dr. Boyce made a Krönlein incision and

found yellow pus under the periosteum of the lateral wall of the orbit. This wall was also thickened and the bone soft. There were granulations around the spheno-maxillary fissure. This was evidently a case of direct extension of an infection from the mastoid to the orbital wall. Reports of such cases were rare.

Discussion. Dr. Isaac Jones demonstrated a skull and a dissection of the head to show the paths of the infection and the structures involved.

Dr. Dean Godwin commented that this case showed the close relationship between the specialties of ophthalmology and otolaryngology and complimented Dr. Homme on presenting a live patient rather than a postmortem report.

Dr. William Boyce described the operative technic of the opening of the orbital abscess and stated that all granulations were removed down to healthy bone.

Dr. Clifford Walker objected to the term retrobulbar abscess in the title of the paper as the whole process was described as being subperiosteal. He described the double venous drainage of the eye and the effect on transmission of infection of the absence of valves in these veins.

Dr. Calvin Townsend inquired if the infection might not have been a metastatic one.

Dr. Harold Whalman stated that throughout the course of the disease there were no fundus changes indicative of cavernous sinus involvement in the right eye.

Dr. Homme concluded by agreeing with Dr. Walker that the term retrobulbar abscess was ill chosen. The fact that there was swelling of the soft palate showed deep involvement of the pterygo-palatine fossa and indicated that there was direct subperiosteal infection from the squamous portion of the temporal bone through the spheno-maxillary fissure to the lateral wall of the orbit. He stated that cells in the zygoma might connect directly with the middle ear.

M. F. Weymann,
Recorder.

BUFFALO OPHTHALMOLOGICAL CLUB

October 19, 1933

Dr. H. H. Glosser presiding

Ophthalmology's contribution to General Medicine

Dr. John Spengler read a paper on this subject discussing photo-physiology and reviewing some of the more recent work on physiological chemistry which concerned the eye.

Buphthalmos

Dr. J. G. Fowler presented four cases of this condition. Two of these cases had had an iridencleisis operation. In each case the involved eyes were nearly blind and the tension was 60 mm. (Schiötz). In one case the disease was not controlled although the tension was lowered to 30 mm. In the other, the tension was controlled but a traumatic cataract followed. Two other cases of unilateral buphthalmos were presented in which the affected eyes were blind. Enucleation was indicated in these for cosmetic purposes. In none of the cases was there any evidence that the disease was inherited nor were there any associatd conditions such as Recklinghausen's disease.

Orbital tumor

Dr. J. D. Flagg presented a case of tumor beneath the bulbar conjunctiva. The flattened mass was located above and seemed to extend back to the fornix. It was yellowish in color. A biopsy showed it to be a fibro-papilloma, a benign tumor which sometimes becomes malignant. Dr. Flagg had seen the patient one and one-half years previously and had not noticed a tumor at that time.

Ivan J. Koenig,
Secretary.

ST. LOUIS OPHTHALMIC SOCIETY

October 27, 1933

Dr. M. W. Jacobs, president

Ocular findings of encephalitis lethargica

Dr. C. J. Gissy read a paper on this subject which included a detailed study

and review of the neuro-ocular signs and symptoms of this condition.

Discussion. Dr. Meyer Wiener noted a difference between the recent St. Louis epidemic and previous epidemics. He had not seen a single eye complication this time but in previous epidemics he had seen numerous eye complications, especially transitory optic neuritis.

Dr. L. T. Post stated that at the beginning of the St. Louis epidemic a division for encephalitis was opened in the Barnes Hospital. Only ten patients were seen. They showed only photophobia with no other eye pathology.

Dr. M. W. Jacobs had the opportunity of examining twenty patients with encephalitis during the recent epidemic. In no cases did he find eye symptoms that could be attributed to this disease.

Dr. J. F. Hardesty saw about sixty cases of encephalitis during the recent epidemic. In about one-half of these cases there was swelling and hyperemia of the disc with engorgement of the retinal veins. Practically all had increased pressure of the spinal fluid.

Dr. Gissy, in closing, said that his experience in the present epidemic was similar to that reported by Dr. Wiener, as he had found only one case with eye symptoms. In the report, he had endeavored to include all possible findings observed in sporadic cases as well as unusual findings that had been mentioned in the literature. About one year ago a young man 23 years of age had consulted him because of dimness of vision in one eye, due to a lesion in the retina. This lesion cleared up rapidly and several weeks later another retinal lesion developed together with a mild optic neuritis of both eyes. At this time the patient appeared drowsy and yawned frequently and said he slept a great deal. A beginning encephalitis was suspected so he was referred to a neurologist who diagnosed the case lethargic encephalitis. The patient was absent for several days and then returned with his wife who said that he had slept for 29 hours and when he awakened his left eye was turned, and that he complained of seeing double. He was sent to the hospital and after a few days other ocular palsies occurred together with ptosis. Sometime later he became unconscious and died in about three months. This was the only case of lethargic encephalitis that Dr. Gissy had observed which showed intraocular findings.

The work of the sight conservation classes in St. Louis

Dr. Howard C. Knapp reported that five classes were now operating in St. Louis with a total enrollment of 111 pupils. Total school enrollment was 95,025. Included in the five classes was one for negroes and one for high school students. Beginning this year a vision of 20/50 or less in the better eye after correction was the standard for admission.

Discussion. Dr. Meyer Wiener said that he thought the classes were misnamed, that he could not think of any condition of the eyes in which the sight was conserved, that he did not believe that the use of the eyes in progressive myopia had anything to do with myopia, and that he thought the child should endeavor to obtain an education rather than save the sight.

Dr. L. T. Post believed that the visually defective children should be allowed to recite as much as possible with the other pupils. Mentally defective children who were semi-sighted should be separated from the other semi-sighted pupils.

Juvenile glaucoma

Dr. J. F. Hardesty reported two cases treated with ephedrin administered orally. Improvement was noted. This paper will be published later in this Journal.

Howard C. Knapp,
Editor.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 21, 1933

Dr. Hugo B. C. Riemer presiding

Comparison of operations for chronic glaucoma

Dr. Allen Greenwood read a paper on this subject which was published in the

Arch. of Ophth., 1933, v. 10, Oct., p. 472. He then presented a case in which both eyes were operated on for chronic glaucoma. The right eye was operated on two years ago, and the left eye six months ago. There was no sign of glaucoma in the left eye at the time of the first operation. The tension in the right eye was high and an iridencleisis with sclerotomy was performed. A trephining with button-hole iridectomy was performed upon the left eye. Both eyes were soft and the vision was slightly better now than just prior to the operations.

Postoperative inhibition of ocular muscle

Dr. Herman P. Grossman presented a girl who was first seen on February 17, 1933, complaining of convergent strabismus. The vision was 10/200 O.D., unimproved; 20/20 O.S., with +4.00 D.sph. 20/15. She had been wearing glasses since six years of age. No other member of the family had any ocular disturbance. She was operated on the following day, under ether anesthesia. A tucking of the external rectus, shortening of the muscle 11 mm. and a tendomuscle lengthening of the internal rectus muscle was performed. The second day after operation, the eye deviated about 10 degrees outward. This grew rapidly and progressively worse until, in the 6th day, the right eye did not rotate beyond the mid line; it was estimated that the divergence was more than 40 degrees. The patient was sent home with instructions not to wear her glasses. A week later both eyes were in very good position for near and distance vision. This condition had remained until today when there was again a slight amount of divergence. This case was thought to be of unusual interest since the motor inhibition of the internal rectus muscle endured about 14 days and was followed by complete recovery of function with good cosmetic result.

Juvenile glaucoma (?)

Dr. W. Holbrook Lowell presented a three-year-old boy who came to the Eye Clinic on March 16, 1933, showing very large corneae, blue sclerae and staring eyes. The tension was 20 mm. in each eye. There was high myopia, probably 14 diopters. The discs were normal with no cupping. Dr. Lowell thought this was a case of buphthalmos and the question then arose as to whether or not there was going to be an elevation in tension. He felt the case was worthy of careful watching and follow-up, but did not think an operation was necessary at the present time.

Discussion. Dr. Walter B. Lancaster stated that in a young patient with glaucoma the weakest part of the eye was not the lamina cribrosa therefore one should not expect to get cupping of the disc but expansion of the entire eyeball. In the literature it was reported that most cases of myopia were due to increased intraocular tension. In this case the tension certainly was not high but was higher than the eye could tolerate. Dr. Lancaster felt that there would be some benefit from an operation to decrease the intraocular tension.

Dr. Frederick H. Verhoeff said that in his opinion the eye should be watched for a while before operation.

Dr. Allen Greenwood said that the eye should be carefully observed. The condition did not strike him as being buphthalmos but he felt that it might be myopia due to a stretched eyeball as Dr. Lancaster suggested.

Capsular cataract with glaucoma

Dr. J. Herbert Waite reported a case in which a 73-year-old man lost the sight of his left eye through complete detachment of the retina following a cataract extraction forty years previously. The left eye was now blind and divergent, with a tremulous iris. The right eye began to fail during the past year, without pain or outward evidence of inflammation. The tension in December, 1933, was 57 mm. Hg. (Schiötz). The visual field then showed a 20 degree Ronné step in the upper nasal quadrant, and a double Bjerrum defect almost completely isolating the central field remnant. The acuity was 20/30 with a +2.50 D. sphere. The media were sufficiently clear to allow a good view of the fundus, and there was glaucomatous excavation of the disc, but no

retinal hemorrhage. The anterior chamber was of normal depth. The slitlamp showed, after mydriasis with four percent cocaine solution, typical exfoliation of the outer layer of the anterior lens capsule, with many exfoliated particles adherent to the pupillary rim, and to the posterior corneal surface. Extraction of the lens, even though clear, seemed to be indicated in treating the glaucoma.

In an only eye of a patient with hypertension, reduction of the ocular pressure to a safe level must be attained before attempting lens surgery. Otherwise there would be the danger of expulsive hemorrhage at the time of operation. To attain this end, several paracenteses were done without lasting success. A sclerotomy by the Reese method was performed, but the ocular pressure was not satisfactorily controlled. Finally, on the first of March, an iris inclusion operation was done. The ocular pressure had remained under 20 mm. Hg. ever since. Extraction of the lens in the capsule would soon be undertaken.

Vogt in 1925, was the first to discuss the relationship between exfoliated capsule and glaucoma. In separate communications Vogt, Rehsteiner, and Busacca collected 92 cases of exfoliation of the lens capsule, and found glaucoma in 69 of these cases, or 75 percent. The condition was present chiefly in the aged, most of the patients having reached 65 years. It was also discovered in eyes exposed to heat, as in glassblowers (Elschnig). Exfoliation was not present in the posterior capsule, and it began in that portion of the anterior capsule in contact with the iris. Unless the pupil was dilated, the condition was frequently not discovered, at least in its early stages. The exfoliated particles were actual capsule material, and not newly deposited tissue, as shown by continuity between exfoliating portion and clear capsule adjacent. It was the idea of Vogt and others that particles of exfoliated capsule clogged the drainage channels, and thus produced glaucoma secondarily. Vogt and his associates studied 150 cases of supposed primary glaucoma, and found 13 of these cases with exfoliation of lens capsule.

Here, then, was an important form of glaucoma which was frequently overlooked, and which did not yield to ordinary glaucoma operations. It was best recognized with the slitlamp, with dilated pupil. The best results followed removal of the offending lens.

Obstruction of the central retinal vein

Dr. Benjamin Sachs presented a 44-year-old man who had had an attack of blurring in the right eye about 6 or 8 weeks previously. It lasted about an hour. A week later he had another attack of blurring which lasted several hours and recently there was an attack which lasted a whole day. These attacks were not associated with pain, headache or nausea. His health was good and he never had any trouble before. Examination showed that the right eye was slightly more prominent than the left. With the exophthalmometer there was a difference of 1.2 mm. to 2 mm. Otherwise the eyes were negative externally, without disturbance of ocular motility. The right fundus showed a blurred disc with about 2 to 3 diopters of choking. The retinal veins were greatly distended and engorged, with much tortuosity. There were many flame-shaped and round hemorrhages scattered throughout the fundus. The vision was 20/15. The left fundus was essentially negative and vision was 20/20. Perimetric study was negative. The x-rays of the skull were negative. Sinuses were clear and the orbits showed no abnormality. The blood Wassermann was negative; the red cell count normal. Genito-urinary examination was negative. X-rays of the teeth showed several apical abscesses.

Discussion. Dr. Jeremiah J. Corbett stated that he had had a case with a similar fundus picture and disturbed vision. The patient was 62 years old and on examination showed abscessed teeth. Two weeks after the infected teeth had been extracted the vision returned to normal and the pathology in the fundus improved.

Retrobulbar optic neuritis

Dr. James J. Regan presented a 22-year-old man whose chief complaint

was progressive blurring of vision in the right eye of three weeks' duration. There was tenderness on palpation of the right eye. One week ago the vision was 20/200 O.D., with a central scotoma. The vision in the left eye was 20/20, with normal field. The fundi showed nothing but a moderate pallor of the right disc. A diagnosis of retrobulbar optic neuritis was made. The sinuses were negative. The right third molar tooth was found to be infected, and was extracted. One week ago tenderness on palpation was more marked on the right than on the left side. Tonight he stated there was more tenderness on the left side than on the right.

Following tonsillectomy on March 22, 1933, the vision and fields returned to normal in both eyes, although the pallor of the right disc persisted.

Dr. James J. Regan,
Recorder.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 10, 1933

Dr. J. B. Stanford presiding

Altitudinal hemianopsia with optic atrophy and cupping of the discs

Dr. Phil. M. Lewis reported the case of G.D., a white man aged 74 years who exhibited this condition. The patient was first seen in October 1929, complaining of failing vision for the past two years. Vision was O.D. 20/100 unimproved by lenses, O.S. 20/40, improved by lenses to 20/20. The eyes were normal externally and the media clear but the discs showed marked atrophy, cupping and a crowding of the vessels over the nasal borders. Tension was taken and found to be 24 mm. (Schiötz). There was a superior altitudinal hemianopsia of the left eye extending down to within three degrees of the point of fixation and including the blind spot. The field of the right eye was irregularly contracted, most marked in the upper temporal region. The blind spot was enlarged and there was a small para-central scotoma below. There were no symptoms or signs of brain tumor.

This patient was seen about every two months during 1930, and until July 1931. The field defects had become slightly larger, but the tension always was found to be about 24 mm. Pilocarpin one percent twice daily was prescribed. He died suddenly early in 1932, the attending physician being in doubt as to the cause of death and autopsy was not allowed. His blood pressure was never very high, the blood was negative for syphilis and his general physical condition had always been found essentially normal.

On account of the appearance of the disc this man was considered to have an atypical glaucoma and consequently miotics were used regularly. After reading Knapp's excellent article in the Archives of Ophthalmology for November 1932, concerning sclerosis of the cerebral basal vessels with resulting optic atrophy it was realized that this was undoubtedly the cause of the optic atrophy in this patient. Proper x-ray examinations would probably have revealed calcification of the internal carotid and other cerebral basal vessels.

Retinoblastoma

Dr. R. O. Rychener presented a section of the left eye of J.W. removed March 1930, for retinoblastoma when the patient was fifteen months old. The orbit had been exposed to x-ray therapy following the enucleation and there had been no recurrence to date. The right eye at subsequent examinations was normal.

The tumor as seen grossly in the section had invaded the optic nerve for 1.5 mm., but the nerve had been cut long enough apparently to include all of the extension.

Congenital ptosis and lack of vertical movements of the eyes

Dr. Phil. M. Lewis presented two patients on whom he had recently operated for ptosis. The first patient S.J., a white boy aged seven years, was operated on in July, 1933, by resection of the levator tendon. He was the third

and youngest child of the family, the others being normal. He was very frail as a baby and his eyes never seemed normal. To look at things, unless they were directly in front of him and on the same level as his eyes, he always had to turn his head. Except for his eyes he was now a normal child.

Examination revealed a partial ptosis of the left side. Besides the ptosis the following defects in movement were present: the right eye could be moved neither up nor down, but the lateral movements were fairly normal; the left eye could move inward normally, outward only poorly and up and down not at all. Both eyes had a compound hyperopic astigmatism of moderate amount but vision could not be improved beyond 20/50. Convergence and accommodation were normal.

The second patient M.P., a white girl, aged 13 years, was operated on in August 1933, by the method of Motais. She had had a drooping of the upper right lid all her life and could never see well with this eye.

Examination revealed a complete ptosis of the right upper lid. Motion of the eye was normal in all directions. Vision was 10/200 improved by proper myopic correction to 20/40. The left eye was normal.

Discussion. Dr. E. C. Ellett said that his best results had been obtained by the Motais operation. He liked particularly the open modification of this technic which made the operation easier and the results more successful.

Dr. J. B. Stanford wondered why eyes with ptosis usually had high refractive errors and poor vision.

Dr. Lewis (closing) thought congenital conjugate paralyses rather rare. This was the only case of paralysis of sursumversion and deorsumversion that he had ever seen. Several years ago he presented before the Society a young man with bilateral conjugate paralysis of lateriversion which also was a congenital condition. These cases might be due to an actual absence or abnormal insertion of certain of the rectus muscles. Also, they might be of basal or peripheral nerve origin, in which case they were not true conjugate paralyses, as the centers controlling conjugate movements were not involved.

Jugular foramen syndrome

Dr. John J. Shea said that Mrs. C. D. M., aged 29 years, presented a left orbital swelling, bilateral abducens paralysis and paralysis of the left 9th, 10th and 11th cranial nerves. X-ray revealed a mass posterior to the left antrum. Dr. Stanford considered the abducens paralysis as congenital in origin.

The left antrum was entered through the mouth; the membrane over the posterior wall was edematous and hemorrhagic. The bone of the posterior wall was thin and upon removal exposed a diffuse tumor. A biopsy specimen was reported as sarcoma. The following day the external carotid was ligated and five needles of 10 milligrams each of radium were buried in the tumor for 24 hours (total 1200 milligram hours). The reaction was very moderate and the time since operation too short for a prognosis to be given.

R. O. Rychener,
Secretary.

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530 Metropolitan building, Denver
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SURGICAL TREATMENT OF HIGH MYOPIA

In his lectures on diseases of the eye, the Dutch surgeon, Hermann Boerhaave, sometimes called the Batavian Hippocrates because of his renown as practitioner and teacher, asked the question why a myope who had been cured of cataract by operation did not require the convex lens necessary for other patients after cataract operation. His answer was to the effect that, the lens having been removed, the focus of the eye was placed farther behind the cornea, falling now upon the retina, whereas formerly it was placed in front of the retina.

Similar comments as to the fortunate condition of the myope after cataract extraction were made by other writers after the time of Boerhaave. In 1772 a Frenchman, Jean Janin, described a case in which "myopia changed into presbyopia after extraction of cataract, . . . being able to read without glasses by placing the book about fifteen inches from the eye. . . . What can be the cause of this phenomenon?"

In 1775 Albrecht Haller, the Swiss physiologist, a pupil of Boerhaave, and founder and first president of the Royal Society of Göttingen, credited an English oculist named Higgs with having cured myopia by depression of the crystalline lens.

A few years later Abbot Desmonceaux, characterized by Panas as "physician philanthropist," speaking of those unfortunate myopes whose focus is at two or three inches, advised "extracting the crystalline lens, which will diminish the stretching of the cornea and will make the image of objects sharper." "This operation," he adds, "is less dangerous than that for cataract . . . this disease (myopia) consists in the excessively great volume of the lenticular body." Desmonceaux had frequently seen the operation done, but the available evidence fails to demonstrate that he himself performed it, although such a claim has been made in his behalf by several writers, including especially Vacher.

Desmonceaux impressed upon his readers that this remedy for high myo-

pia had not been known or practicable before the discovery of cataract extraction (as opposed to couching).

Within the last one hundred years or so, destruction or removal of the crystalline lens for the relief of high myopia has been tried by many ophthalmic surgeons of renown. Probably the greater number of these have sooner or later condemned the operation as increasing the danger of ultimate loss of vision.

If it were certain that no complication would accompany or follow the operation, many high myopes would probably elect to have the lens extracted and most eye surgeons would be willing to undertake the operation. Unfortunately such an operation can never be regarded as entirely free from risk. Meller (in his "Ophthalmic surgery"), after discussing the indications and describing the technic, remarks that eyes operated upon for myopia are especially prone to develop detachment of the retina, and that the operation does not safeguard the eye against those serious intraocular changes which so frequently occur sooner or later in high myopia.

The subject was discussed at the Heidelberg Congress in 1858. Mooren and Weber presented a few patients so treated, but with rather discouraging results; and Donders and Graefe, among others, vigorously condemned operative attempts in myopia. At the Heidelberg Congress in 1892 Pflüger reported five cases in which discission of the lens of the myopic eye had produced good results. But surgeons like Landolt and Michel rejected the operation. Valude had occasion to report the case of a boy of ten years, with a myopia of eighteen diopters, in whom one eye had been operated upon by extraction and the other by discission followed by extraction. In each eye the result was at first excellent; but in the eye in which extraction had been performed without previous discission the sight was lost from retinal detachment two months later.

Among those writers who have strongly advocated removal of the lens in cases of high myopia is Lawford, who brought the subject before the British Medical Association in 1896. In the literature he found general agreement that the operation was not justified in the presence of less than eleven or twelve diopters of myopia, some authors demanding a minimum as high as fifteen diopters. The reduction of the refractive error obtained by removal of the lens usually amounted to from thirteen to sixteen diopters. As to technic, Lawford favored discission and later extraction.

One of the more recent papers on this subject is by Lopez Abadia (Archivos de Oftalmologia Hispano-Americanos, 1933, volume 33, page 329), who is able to report on forty-three cases. He does not agree with Vacher that removal of the lens arrests the progress of the myopia and avoids chorioretinal complications or retinal detachment. But upon the basis of his experience he favors operating in the presence of fifteen diopters or more of myopia with corrected vision of not less than one-third.

Motolese (Bollettino d'Oculistica, 1933, volume 12, page 1173), working in the clinic of Bardelli at Florence, Italy, reviews at great length the history of the subject, and tabulates and discusses the results obtained by Bardelli with a method in which are combined preliminary free discission and later aspiration of lens substance by means of a syringe and needle of the hypodermic type.

Bardelli's method may be summarized as follows: A broad discission of the anterior capsule and of the anterior layers of the lens is done with a Graefe knife, inserted at the limbus. Atropin is instilled and the patient kept under observation. Unless an acute rise of tension makes earlier interference necessary, the second step is postponed four or five days. The limbus is opened with a Graefe knife. The point of the rather large hypodermic needle used has previously been blunted on a grindstone. In entering the anterior chamber, the bevel of the tip of the needle should be turned toward the iris to avoid damaging that structure. In aspirating the lens substance care must be taken to avoid contact with the iris, which might

otherwise be aspirated into the needle.

From the results obtained in thirty-two cases, Motolese recommends removal of the lens in cases of high myopia as permitting the patient to indulge in normal activities from which he was previously excluded. Done under proper conditions the operation is said always to produce a noteworthy increase in visual acuity. The author does not believe that after such operation the myopia continues inexorably its malignant course, any further increase of refraction being minimal.

The complication most dreaded by many authors is detachment of the retina. But according to Motolese this sequel is not to be attributed to surgical intervention, since precise statistics show that the postoperative incidence of detachment in such cases is not greater than in unoperated cases. Motolese would not perform the operation in the presence of less than sixteen diopters of myopia.

It will be remembered that in the June, 1933, issue of this Journal Roderic O'Connor reported on ten patients in whom the lens had been removed for high myopia. There were no failures, the eyes were in much more useful condition after than before operation, and O'Connor suggested that with reasonable care and selection, consistently good results might be expected.

W. H. Crisp.

PITUITARY HEADACHE

There was a time when nasal discharges were supposed to be secretions from the pituitary gland. Now its deep, inaccessible location causes it to be often overlooked. Eye strain is such a common cause of headache, that most cases of chronic, or recurrent headache, come to the attention of the eye physician. Those who correct errors of refraction, think first of that cause, when headache is mentioned as the prominent symptom. Those who also treat the ear and nose have other local conditions to think of as causes of headache.

But to make a real diagnosis we must not simply accept the most obvious, or common, of the explanations of headache. The tentative diagnosis points to something that ought to be investigated, but often it is most serviceable when the physician who had first made it sets himself to prove that it is not correct, and carefully reviews all other diagnoses. The fact that most of our practice may be the relieving of eye strain, should not shut out of consideration other fields for medical exploration, and that as physicians we are bound to consider them.

Diseases of the pituitary body are not very common, but among their symptoms headache is most frequent and likely to arrest the patient's attention. De Schweinitz emphasized this in his Bowman Lecture, and it was shown in his earlier studies made with the help of Carpenter and Holloway. It is the symptom that brought the patient to seek help in most cases of acromegaly, but in some cases it was entirely absent, and impairment of the visual fields brought the patient to the ophthalmologist.

Pituitary disease includes various conditions likely to produce headache. Increased pressure upon the afferent nerves of the parts is one of the simplest and most obvious. The normal pituitary body, the hypophysis, lies in the bony cavity of the sella turcica, confined there by the thick, rigid membranous diaphragm, that separates it from the optic chiasm and related parts. Cushing has reported cases in which an operative incision of this diaphragm, without removal of any tissue involved, has given lasting relief from the headache. In other cases the destruction, or breaking through this diaphragm, by extension of a tumor, has brought relief, or decrease of headache.

On the other hand increase of the hypophysis during pregnancy, or by repeated pregnancies, and which has been demonstrated by roentgenography, and by postmortem weighing of the pituitary body, by several observers, has not been attended by constant or general headache of notable severity. Acromegaly is generally marked by headache but it is not increased, or progressive in proportion to the enlargement of the sella. Indeed the headache has become

less after middle life, in patients who showed increased deformity of the osseous system.

The close association of the optic nerves, chiasm and tracts with the pituitary body and region, has made the ocular symptoms the most common evidence of pituitary disease. Pressure may account for striking limitations of the visual field but the transient amblyopias that may appear early in the case, and the beneficial effects of roentgen ray applications to the gland, or the feeding with pituitary extracts, point to the importance of functional endocrine disturbances.

The same inference is to be drawn from the series of cases of headache with bi-temporal limitation of the visual fields, reported in the paper presented by Dr. Beulah Cushman to the Section on Ophthalmology of the American Medical Association, at the Milwaukee meeting last June. Cases of headache in which the correction of refractive errors did not give relief, were studied with the aid of an internist and a roentgenologist. The limitations of the visual fields, generally bi-temporal contractions, with color scotomas in the temporal fields, were strikingly similar in the different cases. Of the ten patients, nine were women. But the one man, aged 39 years, who had suffered from frontal headache for four years, with mental confusion when the headache was severe, recovered from headache, and regained normal visual fields under use of whole pituitary extract for seven months. He remained well more than three years afterward. Of the other cases, five had suffered from the headache for periods varying from 15 to 24 years, and of these the four who submitted to the treatment were greatly benefited.

The cases of recovery should suggest that early recognition of the functional condition, and its successful treatment, may sometimes check the pathological process that would otherwise result in recognized organic disease. Certainly all ophthalmologists should be alert to observe the headaches and field changes that first point toward pituitary disease.

Edward Jackson.

OPHTHALMOLOGICAL BOOKS FOR LAY READERS

Recently there has been written for the public a considerable number of books on medical subjects. This is in line with the effort to discard mystery in medicine and to educate the lay world to avoid disease and ill health. Undoubtedly these books have a large audience and are probably second only in importance to the medical advice columns in the daily newspapers in disseminating medical knowledge. Ophthalmological subjects have had their share of publicity and this is well, for too much cannot be known about the physiology and proper care of the eyes.

One of these books was reviewed in this Journal (v. 16, no. 8, p. 736) and another is reviewed in this issue (p. 262). It is quite surprising that with the complete agreement among physicians about the advisability of good lighting and good position of work, there are very few schools, public or private, in the country, in which the lighting does not violate most of the principles of satisfactory illumination and in which the reading and writing are not placed in poor position.

Usually the defect in lighting is not so much lack in amount as it is improper distribution. Seldom are desks arranged to permit of light coming from the correct direction. It has been determined that working efficiency increases rapidly from darkness to five or six foot-candles. Thereafter the curve flattens out remarkably and there is practically no efficiency increase above ten foot-candles, for work on material of average brightness. The item of the light absorbing qualities of material is vastly important because the variation is so great that there is required twenty times as much light when working on black goods as when using white. Ten foot-candles are adequate for the illumination of test cards. This is well above the point where the efficiency curve flattens and yet is far short of glare.

By one foot-candle is meant the amount of illumination at a point one foot from a source of light emitting one candle power in the direction of the surface. Though many are quite aware of

this fact, few know what the appearance of one foot-candle would be on a chart or the appearance of ten or twenty foot-candles. It is now possible to purchase light-meters for measuring the amount of light on any given surface. Measurement of a card lighted by one of the standard systems for illuminating test cards in a recent test indicated between thirty-five and sixty foot-candles, depending on the accessory illumination in the room; though the distribution was not entirely equal on the chart. Equipped with such a light-meter it would require only a short time to test the quantities of light at the crucial places in any study or factory room.

Considering for a moment the posture of the child and the position of his work we find that a glimpse into almost any class-room will illustrate exactly how things ought not to be. The child will be seen hunched over a desk, too high or too low, face close to book or paper, casting a shadow on his work, or else the youngster will be slumped down on his spine with book held in some absurd position. Adjustable seats so that the feet of the child will rest comfortably on the floor; adjustable desks so that the distance from the head to the book will be correct, with a top that can be tilted up from the far edge, are essential.

As these matters now exist it is not so remarkable that more and more adults must wear glasses, as that it is not a universal necessity. Only a strong constitution and good heredity can withstand the strain imposed on the undeveloped eyes of the growing child.

Other important subjects that cannot be stressed too often are the dangers of firearms, Fourth of July celebrations, and the hazards of industry. Though well aware of the risks in all of these things, reiteration cannot be too frequent because in spite of the educational campaigns already waged, the toll of damaged eyes is still far too great.

These and many other important points of anatomy, physiology and pathology are brought out in popular ophthalmological works. It is well that these ideas should be given wide publicity and it is hoped that these books will be read by many people. Whenever the chance offers let us do what missionary work we can to help conserve the sight of the coming generation.

Lawrence T. Post.

BOOK NOTICES

Good eyes for life. By Olive Grace Henderson, Associate, and Hugh Grant Rowell, Assistant Professor of Health Education, Teachers College, Columbia University. Cloth 12 mo., pp. 216, Illustrated. D. Appleton-Century Company, New York-London, 1933. Price $2.00.

A book written for lay readers sometimes furnishes good reading for the specialist. The eye physician should always be a teacher of his patients, and the way others would teach the same things must be to him suggestive. By comparison he may improve his own methods and become more effective in giving the instruction that each patient needs.

This book, written by those engaged in training teachers, gives elementary instruction about the eye, such as may be found in other books of the kind. But in the fifth chapter, "Eyes Right in School," it emphasizes the proper method to be taught children to use their eyes and does it in a way that will impress points too often neglected or not understood. The proper lighting arrangements and seating of the pupils is told and shown in a way that makes the facts clear, so they are not likely to be overlooked or forgotten.

The sixth chapter on, "Eye protection for the handicapped," enforces its lesson in a way that is likely to correct any underestimate of its great importance, for eyes of those who also have other physical handicaps to contend with.

Chapter seven continues the same teaching of how to use the eyes, pointing out that it is not sufficient for the child to learn how to use his eyes rightly in school, but that the home use of them must often be corrected, so that the pupil may use his eyes there to as good advantage as he does at school. The importance of the eyes through all the succeeding years of life, demands

that their correct use shall be a fixed habit, not merely a school exercise. Chapter seven, "Eye happiness in the home," is a chapter which carries a thought very much needed by the majority of homes.

"Eye protection in industry" has a chapter it well deserves but attention to this matter has of late been forced upon business men, who are beginning to appreciate its economic importance. Interest is well sustained in all the later chapters and at the end there is a good alphabetic index. The book is one worthy of the attention of any one who takes a real interest in practical use of the eyes. Edward Jackson.

College of Physicians of Philadelphia Transactions, 1933. Series 4, v. 1, 124 pages.

These Transactions will hereafter be issued in parts, instead of the annual volume. This is the first number of Series 4. It contains the list of Fellows, and proceedings of the College for the first half of the year 1933. It contains Memoirs of eight former Fellows, including B. Alexander Randall, G. Oram Ring, Thompson S. Westcott, and the famous surgeon, W. W. Keen. Westcott was at one time Assistant Surgeon to Wills Hospital and continued to practice ophthalmology, but was better known for his writings on pediatrics.

These "Transactions" now contain but a single paper in full, read by an invited guest of the College; all the other papers before the College, or its sections, being given in abstract. For the Section on Ophthalmology there are only the titles of the papers presented at its four meetings. But abstracts of these appear regularly in the American Journal of Ophthalmology, as they have done from the first. The custom of the profession has shifted far from the original practice of publishing all the transactions of a Medical or Scientific society in its annual volume.

Edward Jackson.

Transactions of the American Ophthalmological Society, volume 31, 1933. Edited by Bernard Samuels. Published by Wm. Fell Company, Philadelphia, Pa. 587 pages.

This volume is like its predecessors in form and general appearance. It contains more pages than most of the previous volumes, principally due to the 310 pages of candidates' theses, necessitated not so much by the length of the individual papers as by the unusually large number of candidates, fourteen having been accepted for Associate membership. The list follows: Dr. Grady E. Clay, Atlanta, Ga.; Dr. Frederick C. Cordes, San Francisco; Dr. Perce De Long, Philadelphia; Dr. A. G. Fewell, Philadelphia; Dr. Thomas H. Johnson, New York; Dr. F. Park Lewis, Buffalo; Dr. Ralph I. Lloyd, Brooklyn; Dr. Theodore C. Lyster, Los Angeles; Dr. Robert J. Masters, Indianapolis; Dr. Shaler A. Richardson, Jacksonville, Fla.; Dr. Ralph O. Rychener, Memphis, Tenn.; Dr. Derrick T. Vail, Jr., Cincinnati; Dr. J. H. Waite, Boston; Dr. J. W. White, New York.

Since it is the rule of the Society that candidates' theses may not be published elsewhere than in the Transactions and all of these papers are of importance, it is advisable, for any to whom the Transactions are available, to look over these contributions.

Lawrence T. Post.

Food, Nutrition and Health. By E. V. McCollum, Ph.D., Sc.D. and J. Ernestine Becker, M.A. 146 pages. Published by the authors, East End Post Station, Baltimore, 1933. Price $1.50.

This is a non-technical account of some important discussions in the field of nutrition and their relation to nutrition in daily life. It has no specific bearing on ophthalmology but gives a very good exposition of the major elements in diet. It would be of special value to the ophthalmologist who includes a medical supervision of his patients in his practice. Lawrence T. Post.

Hospital de la Santa Cruz y San Pablo de Barcelona. El servicio de oftalmología del Profesor I. Barraquer. (The Santa Cruz and San Pablo

Hospital of Barcelona. The ophthalmological service of Professor I. Barraquer.) By Dr. Julio Moreno. 520 pages. Many illustrations. Published by Industrias Gráficas Seix y Barral Hnos. S. A. Provenza, 219, Barcelona. Price not given.

This book is a description of Dr. Barraquer's Clinic at the Hospital of Santa Cruz y San Pablo, in Barcelona, and a record of the work done there. It is written by one of his former students, Dr. J. Moreno.

In the first chapter the author gives an account of the building itself showing in several pictures the beautiful architecture of the general hospital of Santa Cruz y San Pablo, one of the largest in Barcelona, and then describes in detail Dr. Barraquer's Clinic and its Departments. The second part contains a description of numerous cases seen at the Clinic, fully illustrated. The material is presented according to the ordinary classification in regions and gives a good idea of the methods of making the diagnosis and the treatments used at the Clinic.

Numerous instruments, original or modified by Dr. Barraquer are reported. For the treatment of strabismus the author describes a tucking operation in which the muscular fold is introduced into a small silver ring by means of a special forceps called "myocampter." The ring stays in place for three or four weeks until the tissues slough and then it is removed. Among other new instruments are an iris forceps, iris scissors, and a microtome.

Dr. Barraquer has also devised an ingenious apparatus with which a number of persons (as many as 15 or 20) can watch an operation at a distance from the surgeon. It is called the *Ophthalmokeiroscope* and is made by Carl Zeiss in Jena. It consists of a long tube about 2 meters in size, which carries in one end an objective fixed at a right angle with the tube and in the other end a ground glass. The objective has a focal length of 0.50 and is placed at this distance above the patient's eye, leaving the operator's movements free. The image formed is reflected by a mirror above the objective, which sends it through the tube to the ground glass, magnified about three times. The writer had the opportunity of seeing the keiroscope during his stay in Barcelona last year and following the progress of the operation easily on the large, fully illuminated image appearing on the ground glass.

The principal interest of the book is, however, the description of phacoerisis and of one session of 12 operations performed at the Clinic. In the round, windowless operating room are set three wheeled tables with three sets of physicians to attend them. The patient is anesthetised and the field prepared by the first set. There is a clock which marks periods of 10 minutes. At the end of the first period the patient (always carried on the same stretcher from one set to the other) is passed to the surgeon, who makes the operation with the patient sitting and usually ends the operation (intracapsular extraction with the vacuum cup) in 10 minutes. Then the patient is wheeled to the third set who introduce the sutures, apply the dressing and give the orders for treatment.

The book describes afterwards the postoperative accidents. Many clinical histories are reported in detail to show the late results of the intracapsular operation.

The writer also had the opportunity during his stay in Barcelona to examine with the gonioscope, many of Dr. Barraquer's operated cases. The great majority were very successful operations, with clear, black, pupils and small peripheral iridectomies, free from adhesions to the angle. As Dr. Barraquer has already published statistics of his results, it is not necessary to mention them in this place.

The last part of the book is devoted to the laboratory work of the Clinic. Many interesting slides of rare or instructive cases, the majority in colors, are shown and discussed.

The book is well written, handsomely printed and illustrated and will, no doubt, prove of great interest to those who can read Spanish, and wish to follow the fortunes of phacoerisis.

Manuel Uribe Troncoso.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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5. CONJUNCTIVA

Lagrange, H., and Delthil, S. **Allergic reactions of the ocular conjunctiva.** Ann. d'Ocul., 1933, v. 170, Dec., pp. 1009-1030.

After relating the nature of allergic reactions and some of the earlier work on allergy, the authors consider clinical types. Of chief interest is vernal conjunctivitis, but sudden appearance of edema is mentioned. Some emphasis is given to the influence of the endocrine system, and in the case reports endocrine disturbances appear common.

H. Rommel Hildreth.

Lijo Pavia, J., Dusseldorp, M., and Bianchi, A. **Pseudotuberculous vegetations of the palpebral conjunctiva in a case of pulmonary tuberculosis.** Rev. Oto-Neuro-Oft., 1932, v. 7, Dec., p. 497.

Sections and inoculations of the growth proved it nontuberculous. (Illustrated.) M. Davidson.

Llamas, J. **Gonorrheal ophthalmia and pyretotherapy.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, May-June, p. 149.

In a male of twenty-five years who had gonorrheal ophthalmia and urethritis, spontaneous recovery in one week resulted from tertian malaria as regards both eye and urethral infections. Silver nitrate, however, was used for the eye. In Morocco, where the writer practices, the natives regularly employ herbs productive of high temperatures to treat gonorrhea.

M. Davidson.

Lumbroso, U., and Thygeson, P. **Studies on the filtrability of trachoma virus.** Arch. Instit. Pasteur Tunis, 1933, v. 22, p. 178.

The literature dealing with filtration experiments in trachoma is reviewed and analyzed, and the general considerations underlying filtration are discussed. The authors report six experiments (using Chamberland L2 and L3 and Berkefeld N filters) in which negative results were obtained.

Phillips Thygeson.

Morax, V. **The follicular conjunctivitides.** Bull. Soc. Franç, 1933, 46th year, pp. 7-142. (See book review, Amer. Jour. Ophth., 1933, v. 16, Dec., p. 1113.)

Morax, V. **Some cases of trachoma presenting diagnostic difficulties.** Revue Internat. du Trachome, 1933, v. 10, Oct., p. 177.

A young individual developed trachomatous infection while in Paris. The disease was unilateral at the onset and was mild, only a few expressible follicles being located in the upper and lower fornices. There was no apparent

infiltration between the follicles. Except for the softness of the follicles this case suggested follicular conjunctivitis, but the subsequent evolution to scarring and pannus confirmed the diagnosis of trachoma. In a second case the only symptom of trachoma was a mild recurring keratitis with pannus, but no conjunctival lesions.

Phillips Thygeson.

Morax, V. **Trachoma at the Madrid International Congress. Alimentation, constitution, and trachoma.** Rev. Internat. du Trachome, 1933, v. 10, Oct., p. 190.

Morax discusses the three reports dealing with the rôles of constitution and nutrition in trachoma which were presented by MacCallan, Angelucci, and Pittaluga at Madrid. Angelucci and Pittaluga were of the opinion that constitution was of great importance, while MacCallan took the opposite opinion. Morax believes all clinical evidence tends to show that trachoma is a communicable disease which affects healthy individuals as readily as the debilitated, and which spreads rapidly in poor populations because of promiscuity only and not because of malnutrition.

Phillips Thygeson.

Müller, A. R. **Influence of climate on the development of trachoma in Egypt.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, July-Aug., p. 194.

In continuation of a previous article, Egypt, with a trachoma incidence of ninety percent, which has not been affected by the energetic campaign of MacCallan, is taken as an illustration of the climatic and geologic influences. These account for the poor results of antitrachoma campaigns in Egypt as compared with the effectiveness of the same in Poland. M. Davidson.

Panico, E. **The influence of pterygium on the refraction of the cornea.** Bull. d'Ocul., 1933, v. 12, Jan., pp. 15-21.

With Amsler's photokeratoscope and the ophthalmometer the writer studied the corneal changes caused by pterygia. He concludes that a pterygium causes flattening of the horizontal meridian of the cornea, but the axis of astigmatism is often oblique because of oblique insertion of the pterygium. (Bibliography.) Melchiore Lombardo.

Papolczy, F. **Molluscum conjunctivitis.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 519. (Ill.)

Five cases of follicular conjunctivitis caused by molluscum contagiosum of the lid margin are described. The process gives the impression of acute trachoma. Aside from mechanical irritation by the tumor a specific action of the filtrable virus must be assumed, since molluscum situated at a distance from the lid margin may produce conjunctivitis. C. Zimmermann.

Pascheff, C. **Conjunctivitis pluripustolosa.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 313.

This has been defined as a malignant form of phlyctenular disease. The pustules average 3 to 4 mm. in diameter and tend to perforate the cornea. Pascheff's patient, a seven-year-old boy, presented seven pustules in the bulbar conjunctiva of the left eye. Physical examination was negafive except for tracheobronchial adenopathy and a positive Mantoux test. An excised pustule showed microscopically marked cellular reaction, with dilated subepithelial vessels surrounded by lymphocytes and leucocytes. Upon resolution, dark spots are left behind in the sclera, such as follow inflammation of that structure. The etiology is obscure. (Five illustrations.)

Eugene M. Blake.

Ponomarev, S. P. **Pterygium among agricultural workers.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 1, p. 62.

Among the agricultural workers of northern Caucasus pterygium is very common. Ponomarev found it in about ten percent of 5328 patients examined. It is serious there not only because of its frequency, but also because of extensive growth and a tendency to recurrence after surgical treatment. The author suggests more thorough investigation of etiology. M. Beigelman.

Poos, F. **Subconjunctival hemorrhage (hyposphagma) as vicarious menstruation.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 661.

A girl aged twenty-two years, who had suffered from amenorrhea with general disturbances within the last four years, received on two successive days at the expected time of her period an injection of prehormone. In the evening menstruation set in with hemorrhage at the lower portion of the conjunctiva of each eye. In another girl, aged twenty-nine years, with normal menstruation, the menses occurred in the evening of a day of strenuous near work, and next morning the patient noticed an extensive subconjunctival hemorrhage on her right eye. C. Zimmermann.

Rostkowski, L. **Clinical evaluation of conjunctival granulations.** Rev. Internat. du Trachome, 1933, v. 10, Oct., p. 194.

Rostkowski discusses the diagnostic difficulties presented by folliculosis, follicular conjunctivitis, and trachoma. He states that folliculosis is not a conjunctivitis but a local symptom of a constitutional disorder characterized by hypertrophy of lymphatic tissue. Careful examination reveals this condition in about fifty percent of children. If a simple catarrhal conjunctivitis is superimposed on this disease the appearance of a follicular conjunctivitis is produced although the follicles are in no way related to the conjunctivitis. The inflammatory type of follicles is larger and softer than the constitutional. Follicles of trachoma and folliculosis may be seen together on the conjunctiva.

Phillips Thygeson.

Ruedemann, A. D. **Conjunctival vessels.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 4, p. 1477.

Speed of flow, size of vessels, and the action of various substances can easily be studied in the conjunctival vessels, and this field apparently offers an excellent location for physiologic vascular study. Thrombi and emboli apparently are present more commonly than had been suspected. Decrease of the capillary bed in the conjunctiva has been coincident with the similar change shown by the histamine flare test.

George H. Stine.

Sédan, Jean. **Pterygium and trachoma.** Rev. Internat. du Trachome, 1933, v. 10, Oct., p. 207.

Sédan notes the rarity of pterygium among trachomatous patients and states his belief that there is a physiobiologic antagonism between the two conditions.

Phillips Thygeson.

Stewart, F. H. **Prowazek-Halberstaedter body.** Seventh annual report Giza Mem. Ophth. Lab., 1932, p. 101.

Stewart finds the Prowazek inclusion bodies only in cases of trachoma complicated by superimposed secondary infection. He believes that the inclusion is a phagocytic vacuole containing bacteria which in the process of digestion become elementary bodies. He states that inclusion blennorrhea is not a clinical entity but consists of a heterogeneous collection of cases of bacterial conjunctivitis in which phagocytosis by epithelial cells can be demonstrated.

Phillips Thygeson.

Strebel, J. **Permanent cures of spring catarrh by cauterization with liquid carbon dioxide.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 512.

After an injection of percaine into the upper lid and insertion of a contact glass on the cornea the conjunctiva is frozen with the spray, the exuberances carefully removed with scissors and cataract knife, and the bleeding surface cauterized with the thermocautery. Limbal excrescences are extirpated and cauterized. The results were very good. C. Zimmermann.

Valière-Vialeix. **Chronic conjunctivitis provoked by concretions of the canaliculi.** Ann. d'Ocul., 1933, v. 170, Dec., pp. 1030-1039. (See Section 14, Eyelids and lacrimal apparatus.)

6. CORNEA AND SCLERA

Avalos, A. **Primary tuberculosis of the cornea.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, May-June, p. 129.

A case of vascularized tuberculous corneal nodule in a woman of fifty-four

years is commented upon. Favorable results from tuberculin therapy are regarded as establishing the diagnosis, but igneous peritomy was also used. Differential diagnosis is discussed. The author concludes that typical tuberculous eye manifestations are produced by adult bacilli, atypical ones by the less virulent, filtrable, and granular immature forms. The first require tuberculin therapy, the second gold salts.

M. Davidson.

Berner, G. E. **Conical cornea complicated by acute ectasia.** Amer. Jour. Ophth., 1934, v. 17, Jan., pp. 22-24.

Chursan, R. C. **Autoserotherapy in trachoma and its corneal complications.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 185. (See Section 5, Conjunctiva.)

Davis, W. T. **Keratitis bullosa. With report of case cured by x-ray.** Amer. Jour. Ophth., 1934, v. 17, Jan., pp. 24-28.

Ferrari, A. **The keratoconus and familial internal degenerative otitic—oculo-auricular—syndrome.** Arch. di Ottal., 1933, v. 40, May, pp. 247-248, and June, pp. 249-265.

A patient had bilateral keratoconus with bilateral deafness. Two other sisters were also afflicted with deafness and also had trachoma of both eyes. Deposition of pigment on the anterior surface of the lens and the bilateral auricular condition are explained on degenerative constitutional grounds. (Six roentgenograms.)

Herman D. Scarney.

Filatov, B. P. **Observations on corneal transplantation.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 136.

To hold back the vitreous, loss of which not infrequently leads to opacification of the transplant and at times to loss of the eye, the author inserts a narrow ivory plate behind the opacity through two corneal incisions until the operation is completed. In a case of extensive vitreous loss he saved the transplant by passing a horizontal and a vertical suture through the anterior chamber and tying the sutures over the cornea so that the transplant was held within the net of threads. Because transplants are more apt to retain their transparency in corneas which have considerable remains of corneal stroma, the author places superficial grafts of clear cornea several months before doing complete transplantation.

Ray K. Daily.

Friede, Reinhard. **Studies in comparison between the sizes of animal and human corneae, with particular reference to human megalocornea.** Graefe's Arch., 1933, v. 131, p. 1.

The sizes of the corneae of various animal eyes were compared upon ratios obtained by multiplying each eyeball to a horizontal diameter of 24 mm., or that of the human eye. When the proportionate width of the cornea would be greater than 11.5 mm., the average width of normal human corneas, it may be conceded that a condition of megalocornea exists. In 12 out of 15 different kinds of fish, in 8 among 16 different varieties of bird, and in 58 out of 63 different types of mammal measured megalocornea in the above sense is present. The author's observations on animal eyes afford no support to the assumption that megalophthalmus totalis or anterior in man must accompany megalocornea. H. D. Lamb.

Hager, L. **Treatment of familial degeneration of the cornea.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 593.

Two cases of Groenouw's type are reported. The treatment (following Loewenstein) consisted in producing intense hyperemia by daily massage for five minutes with a mixture of dionin 0.3, blue ointment, and vaseline ad 10.00, plus heat and atropin. The results were very good. The nodules did not disappear but clearing of the intermediate areas with essential improvement of vision was obtained. There was no consanguinity of the parents and no endocrine disorders existed in the otherwise healthy patients.

C. Zimmermann.

John, I. **Parenchymatous keratitis and saddle nose.** Zeit. f. Augenh., 1933, v. 82, Nov., p. 13.

Saddle nose is rarely reported to be associated with parenchymatous keratitis. In the author's patient saddle nose developed two years after bilateral keratitis. He ascribes the rarity of the association to the fact that intensive therapy administered to patients with keratitis prevents gummatous destruction of the nose. F. H. Haessler.

Killmann. **A rare form of minutely punctate corneal lesion (cornea farinata).** Zeit. f. Augenh., 1933, v. 82, Dec., p. 123.

In a fifty-year-old male corneal lesions consisted of almost uniform distribution of minute noncrystalline white opacities throughout the stroma, limited to the parenchyma but denser in the layers near Descemet's membrane. Corneal sensitivity was reduced, vision nearly normal. F. H. Haessler.

Kuchner, K. **Inoculations with herpes virus.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 485.

Three vertical and three horizontal scratches were made with the discission needle into the corneas of rabbits, and corneal epithelium scraped from patients affected with corneal herpes was then rubbed in with a spatula. From thirty-two out of thirty-six patients small superficial infiltrations were produced along the scratches on the rabbit corneas, and the lesions sent out ramifications similar to those of dendritic keratitis. In no case of relapsing erosion did the inoculated cornea of rabbits show anything but a traumatic reaction. Hence the herpetic etiology of recurrent erosion seems doubtful.

C. Zimmermann.

Piccaluga, S. F. **Ulcus rodens.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 614.

A fifty-three-year-old man suffered from Mooren's ulcer of the left eye. Histological section showed a defect of the corneal epithelium, intact Bowman's membrane, edema of corneal lamellae and necrosis, slight infiltration by leucocytes and lymphocytes, and a lack of new-formed vessels. A neurologist diagnosed a central lesion of the left facial nerve, which the author considers to be the cause of the corneal disease. Eugene M. Blake.

Pillat, A. **A peculiar senile degeneration of the sclera at the site of insertion of the rectus muscles.** Zeit. f. Augenh., 1933, v. 82, Dec., p. 113.

In a woman of eighty-eight years a dark dirty-grey band had developed at the insertion of each rectus muscle, though most extensively at the ends of the lateral recti. The sclera was here thinner and more translucent as shown by transillumination. This condition must be sharply differentiated from senile fatty degeneration of the sclera and its sequel, senile spontaneous necrosis. F. H. Haessler.

Potechina, E. A. **Blood staining of the cornea.** Sovietskii Viestnik Opht., 1933, v. 2, no. 1, p. 83.

The author reports five cases of blood staining of the cornea, in one of which a histopathologic examination was performed. Always the discoloration was of traumatic origin, and followed more or less extensive hyphema. In four cases the tension was normal and in one the eye was hypotonic. Histologic examination of the one case showed in the corneal parenchyma a large number of corpuscles staining with eosin, of irregular shape and much smaller than erythrocytes. In the central part of the cornea these corpuscles, obviously derived from the blood, were situated throughout the full thickness between Bowman's and Descemet's membranes while at the periphery only the posterior layers of the corneal parenchyma were affected. In treatment the author advocates diathermy. M. Beigelman.

Sacha, Anton. **Keratitis nummularis Dimmer.** Graefe's Arch., 1933, v. 131, p. 102.

The clinical findings in two cases of keratitis nummularis Dimmer were reported. The condition in the first case occurred in a child of three years following a fall in which her knee struck

the right eye. Two weeks later, the eyelids were mildly inflamed and edematous. No conjunctival or pericorneal injection was present. In the cornea, paracentral and nasal, was a small circular fine-grained opacity, over which the epithelium was edematous; and just above this was a similar opacity. The anterior chamber was clear and the iris free from changes. One week later, a new circular opacity temporal to the upper one appeared in the cornea, and one month later a furrow extended vertically from this last opacity to the limbus. After seven months the foci were less opaque and were flatly depressed, and the vision in the right eye was 5/8, in the left 5/4.

The second patient was a young tailor of twenty-two years, without history of trauma or other apparent etiology. The right cornea had a large central oval flocculent opacity involving the entire thickness, including Descemet's membrane. Five small superficial, round, fine-grained infiltrations were also present near the limbus above, temporally, and below. Activity ceased after about seven months. The opacities healed with depressions. H. D. Lamb.

Sédan, Jean. **Sensibility of the cornea in trachoma.** Rev. Internat. du Trachoma, 1933, v. 10, Oct., p. 202.

Sédan has noted decreased corneal sensibility in cases of trachomatous pannus. The anesthesia is less marked in recent and acute pannus but has no relationship to the thickness of the pannus. It never involves the entire cornea but is usually limited to the region of and below the pannus. Trachomatous ulcers are usually anesthetic at their bases, and healed ulcers and scars tend to have diminished sensation.

Phillips Thygeson.

Spinelli, F. **Chemical method of corneal tattooing for a brown color.** (Experimental researches and clinical applications.) Arch. di Ottal., 1933, v. 40, June, pp. 266-286.

The author uses four percent gold chloride alkalinized by phenylhydrazene hydrochloride of two or four percent to give a chestnut-brown color. He describes the histologic findings in corneas so treated experimentally, and two clinical cases are reported. The first case of total corneal leucoma was treated centrally with platinum chloride to produce a black pupil, and the remaining zone was tattooed with gold chloride to produce a brown color.

Herman D. Scarney.

Toth, Z. **A case of primary annular cholesterinemic infiltration of the cornea.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 502. (Ill.)

From her eighth year a pale girl of nineteen years had had reddened eyes, frequent headache, and now and then articular pains. The conjunctival vessels encroached 5 mm. on to the cornea. Parallel to the vascular margin the cornea showed a greyish-white opacity similar to gerontoxon but with very fine bloodvessels coming from the limbus. In one sector of the right cornea a yellowish-white opacity extended from the limbus toward the center. Near the limbus the slitlamp revealed small white granules like fat drops in the subconjunctival tissue. The blood showed hypercholesterinemia from insufficient elimination of cholesterin from the blood. A decided improvement was noticed under fat-free diet and later intravenous injections of atophanyl.

C. Zimmermann.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Bietti, G. B. **Annular deposit of pigment on the posterior capsule of the lens associated with pigment deposit on the posterior surface of the cornea.** Boll. d'Ocul., 1933, v. 12, Jan., pp. 1-14.

A myopic woman of forty-four years, complaining of failing vision of the left eye, showed, by the slitlamp, fine granules of pigment floating in the aqueous and also deposited on the temporal side of Descemet's. Through the dilated pupil a black broken ring was visible parallel to the pupillary border and apparently on the posterior lens capsule about 2 mm. from its margin. Subsequently the vision improved, the retrocorneal pigment diminished in amount, and the retrolenticular ring be-

came thinner and more incomplete. The author suggests that the pigment was deposited in a triangular space formed by the lens and the vitreous which he calls the capsulo-hyaloid sinus, and attributes to shrinking of the vitreous in myopia. (Five figures, references.)

Melchiore Lombardo.

Esteban, M. **Coloboma of choroid with conservation of visual field.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, July-Aug., p. 211.

Bilateral inferior coloboma of iris, choroid, and optic nerve, with indications of its being familial, showed normal field of vision for form and color throughout the colobomatous area. This observation would argue against the current assumption of exclusive defective closure of the fetal cleft as the mechanism, and suggests that the defect is rather mesodermic.

M. Davidson.

Hesse, R. **Gonorrheal choroiditis?** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 631. (Ill.)

A girl aged nineteen years showed choroiditic foci over the whole of both fundi, with vision R. = 1, L. = 0.3. Two years later these had partly turned into atrophic spots. Lues and tuberculosis could be excluded, but three years earlier the patient had had gonorrhea, for which she had been treated at the dermatological clinic for four months. Serological test for gonorrhea in cases of choroiditis is recommended.

C. Zimmermann.

Isakowitz, J. **The diagnostic significance of the Ehrlich-Türk line as early symptom of iritis.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 517.

The Ehrlich-Türk line is a vertical blackish streak of varying width on the posterior surface of the lower half of the cornea. It is considered a decided early symptom of iridocyclitis, sometimes of not more than twenty-four hours' duration. As a late appearance it may accompany a subsiding inflammation. Under magnification it consists of innumerable dots of exudation. The author also saw the line in tuberculous choroiditis. C. Zimmermann.

Kassner, Hans. **Bone formation in the eyeball.** Zeit. f. Augenh., 1933, v. 82, Dec., p. 139.

The author found typical plates of bone with typical corpuscles and Haversian canals in the choroid near the posterior pole in histological preparations of an eye which had been enucleated from a man of forty-eight years because of repeated attacks of inflammation which had occurred since a childhood injury. F. H. Haessler.

Kraupa, E. **Iritis and "spondylarthritis ankylopoietica".** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 493.

In four men of ages from twenty-eight to thirty-five years, who for several years had been affected with ankylosis of the vertebral column, acute iritis occurred alternately in either eye. Arthigon in two cases and milk injections in the others effected rapid absorption of exudate and speedy cure. Although there was no history of gonorrhea the ocular affection suggested metastatis from a septic process. A constitutional factor may also favor ossification of the vertebral column.

C. Zimmermann.

Lagrange, Henri. **The diagnosis of iridociliary tuberculosis.** Brit. Jour. Ophth., 1933, v. 17, Nov., p. 679.

This paper is a series of generalizations. Ocular tuberculosis is a secondary lesion supposedly due to superinfection. Diagnosis requires initial proof of the primary infection. Uncertainties must remain until there is fuller information concerning the reciprocal influences of diatheses, hereditary dystrophies, congenital infectious diseases, and acquired infections.

D. F. Harbridge.

Lazarescu, E., and Lazarescu, D. **Three cases of coloboma of the ocular membranes.** Arch. d'Opht., 1933, v. 50, Nov., p. 760.

One case of typical bilateral coloboma of the iris and choroid and two cases of unilateral atypical coloboma of

the choroid are described in detail. In the third case the coloboma resembled an atrophic optic disc.

M. F. Weymann.

Lijo Pavia, J. **A form of persistent pupillary membrane heretofore not described.** Rev. Oto-Neuro-Oft., 1932, v. 7, Dec., p. 505.

A double persistent pupillary membrane is described, one anterior and attached to the periphery of iris, one posterior attached to the collarette, both cribriform, and permitting examination of vitreous but not of fundus. (Ill.)

M. Davidson.

Lijo Pavia, J. **A case of tuberculous iridocyclitis observed for eight years with maintained improvement under tuberculin therapy.** Rev. Oto-Neuro-Oft., 1933, v. 8, May, p. 185.

A case is reported of iridocyclitis, with corneal nodes and vision of 1/25 in one eye and of objects in the other, improving under tuberculin therapy to vision of 1/3 in the better eye and of 1/6 in the other eye, with a relapse when tuberculin was suspended for one year, and partial recovery when tuberculin was resumed. The eye with visible fundus showed patches of choroidal atrophy near the papilla, and the writer believes that all cases of tuberculous iridocyclitis are accompanied by serious disease of the choroid. (Ill.)

M. Davidson.

Majoros, Johann. **Postmortem changes in the aqueous humor.** Graefe's Arch., 1933, v. 131, p. 139.

In two-thirds of the cases, postmortem aqueous showed increase in protein and in the goldsol reaction. Changes in the aqueous of the cadaver permitted no conclusion regarding conditions in the living organism. But the findings plainly indicated that the blood-aqueous barrier could be ruptured even before death, during the agony or in the most serious disease conditions. H. D. Lamb.

Pitincart, E. **Traumatic aniridia and aphakia.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, July-Aug., p. 185.

In connection with an acute infection of one eye in a woman of seventy years, the writer had occasion to examine the fellow eye, injured twenty-two years before by a fist blow. This eye had aniridia and aphakia, with an upward scleral rupture. M. Davidson.

8. GLAUCOMA AND OCULAR TENSION

Corrado, M. **"Nevus flammeus" and glaucoma.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 553.

A man of thirty-five years had had an angioma of the skin of the left side of the nose and about the inner canthus since birth. It had increased in size in recent years. There had also been notable redness of the left eye since infancy but no ocular symptoms until the age of twenty-seven, when pain, haloes, and loss of vision were noticed. The eye presented the usual picture of chronic glaucoma plus bluish-purple discoloration of the sclera and dilated, tortuous vessels of the bulbar conjunctiva. The author concludes that his patient's condition resulted from an angiomatoid invasion of the uveal tract, causing swelling of the ciliary body and obstructing the outflow from the anterior chamber. This opinion is strengthened by a history of recurrent gingival hemorrhages. A good review of the subject to date is given. (Two illustrations.)

Eugene M. Blake.

Csillag, F. **Acute glaucoma treated with cyclodialysis.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 660.

In all cases of acute glaucoma, except one, cyclodialysis gave a perfect result. In the one case iridectomy was required later. C. Zimmermann.

Ferrari, A. **Researches on the action of the hormone of the suprarenal cortex on the eye.** Arch. di Ottal., 1933, v. 40, July-Aug., pp. 308-317.

The author performed experiments with suprarenal cortical hormone on isolated frog eyes, on rabbit eyes, and on normal human eyes. He describes the method of preparation of the hormone. He concludes that the hormone has no effect on the pupil or the intra-

ocular tension of human or animal eyes, and that it has no synergistic or inhibitory pharmacodynamic action with adrenalin. Herman D. Scarney.

Kayser, B. **Very deep complete excavation without glaucoma.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 589. (Ill.)

In a woman now seventy-six years old, Kayser had observed for twenty-five years severe atrophy of both optic nerves with deep excavation but without other symptoms of glaucoma, especially hypertension. The vision of the left eye remained normal. The vision of the right eye, with the larger excavation, was normal till 1916, when a central scotoma gradually reduced vision to counting fingers at three meters, but with normal peripheral field. The case showed that atrophy of the optic nerve may also produce a very deep excavation probably by foci of softening in the nerve. A brother of the patient who likely had the same condition had had bilateral iridectomy at a relatively early age, and had been totally blind for decades. The author thinks his patient would have met the same fate if operated upon. C. Zimmermann.

Margolin, G., and Lipovich, H. **The application of cervical diathermy in glaucoma.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 159.

On the theory that the basis of glaucoma is a vascular disturbance and that diathermy applied to the neck exerts a favorable influence on the ocular circulation through its effect on the vegetative centers of the cervical spinal cord and on the cervical sympathetic ganglia, the authors tried cervical diathermy in thirteen cases of primary glaucoma. They obtained improvement in acuteness of vision and enlargement of the visual field, even in cases refractive to eserin. The effect is not permanent. Ray K. Daily.

Nicolato, A. **Further results of the application of posterior scleral trephining in secondary glaucoma with blocking of the iris.** Arch. di Ottal., 1933, v. 40, July-Aug., pp. 359-369.

The author concludes from the cases thus operated on that he was able to conserve globes which otherwise would have been enucleated. In this way he finds it possible to keep the tension low over a long period of time.

Herman D. Scarney.

Rycroft, B. W. **The treatment of glaucoma.** Brit. Med. Jour., 1933, v. 3793, Sept. 16, p. 523.

Rycroft thus summarizes his treatment for acute glaucoma: (1) patient put to bed sitting up; (2) aspirin or morphine for pain; (3) leeches to the outer canthus; (4) miotics; (5) hydragogue cathartics; (6) electric eye warmer; (7) tension reduction by diathermy of saline; followed by (8) operation under subtenon or retrobulbar novocain anethesia. The nonoperative and operative treatment of chronic glaucoma is also discussed. (Twenty references.) Ralph W. Danielson.

Spratt, C. N. **Pocket-flap sclerectoiridodialysis in glaucoma.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 18, p. 1615.

The author's technique is described in detail, and results in twenty-eight cases are tabulated, including five of acute congestive glaucoma and twenty-three of the chronic type, of which seven were blind with absolute glaucoma. Following the operation the pressure was reduced to normal limits in every eye, and had remained so during the months of observation. Four eyes showed slight contraction of the visual field after operation, but in the remaining seventeen there was definite increase in size of field. The vision in three eyes was slightly reduced after the operation, but in the other seventeen the vision was the same or better. The author argues that iridodialysis relieves blocking of the angle of the anterior chamber better than iridectomy. There is no distortion of the pupil, and as the sphincter is intact miotics may be used after the operation. (Six figures, one table, discussion.)

George H. Stine.

Tillmann, W. **Recurrent detachment of the choroid of unusually long duration after Elliot's trephining, with spontaneous healing.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 528.

A man aged sixty-seven years, with marked arteriosclerosis, presented after Elliot's trephining with total iridectomy a detachment of the choroid lasting for 150 days. Eighty-five days after the first reattachment a second separation occurred which healed in fifty-seven days. Thus favorable prognosis may be warranted in detachment of the choroid lasting almost five months.

C. Zimmermann.

9. CRYSTALLINE LENS

Aliquo-Mazzei, A. **Cataract and atrophic myotony.** Lettura Oft., 1933, Aug., p. 355.

After summarizing the characteristic features of this disease as hitherto observed, the author describes a case. The patient was a male aged thirty years, with poorly developed thyroid and testes, along with cataract. (Bibliography.) F. M. Crage.

Busacca, A. **Operation for secondary cataract.** Lettura Oft., Sept., 1933, p. 425.

The three cases operated on by the author were one of inflammatory secondary cataract after extraction of the senile type, one of congenital cataract, and one of a posttraumatic cataract. Introducing a Bowman needle at the limbus and maneuvering it slowly, a circular peripheral discission was made, separating the capsule from the iris adhesions. The extraction of the membrane was done at the same sitting with iris forceps or Kalt's capsule forceps, after a keratome incision which followed the discission. There were no operative complications. The anatomic and functional results were satisfactory. F. M. Crage.

Costi, C. **Lacarrère's electrodiaphakia,** Rev. Oto-Neuro-Oft., 1932, v. 7, Dec., p. 493.

The writer has now done seven operations by electrodiaphakia, and finds it simple, free from complications, without vitreous loss, and with as good visual results as heretofore. One case, complicated by sinking of the cataract into the vitreous after section, and negotiated successfully with the electrodiaphake, is reported in detail. The slitlamp showed no injury to the vitreous from the maneuver. Electrodiaphakia is especially the method of choice in extraction of luxated lenses.

M. Davidson.

Handmann. **Five cases of anterior polar cataract as special form of incipient senile cataract.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 488. (Ill.)

The histories and partially observed courses indicated that the polar opacities had developed spontaneously with advanced age. None had nystagmus. Occasionally senile cataract may develop in any layer of the lens.

C. Zimmermann.

Krause, A. C. **Chemistry of the lens. 3. Autolysis of the lenticular proteins.** Arch. of Ophth., 1933, v. 10, Nov., pp. 631-639.

Experiments in autolysis at various pH values were carried out on lens substance, separated from the capsule, from 150 bovine eyes. The author concludes that many pathologic lens changes result from acidosis of the lens caused by dying or dead cells or fibers. The lens possesses at least two kinds of proteolytic enzyme. Beta protease, in acid mediums, hydrolyzes beta-crystallin and albumin into simple proteins. Alpha-protease, in acid and alkaline mediums, hydrolyzes simple proteins into amino-acids, peptides and peptones. J. Hewitt Judd.

Lo Cascio, G., and Bertuzzo, G. B. **Spectrographic researches on the crystalline lens.** Ann. di Ottal., 1933, v. 61, Oct., p. 721.

A series of experiments were carried out by the authors, who arrive at the following conclusions: The lens power to absorb short-wave radiations varies according to the animal species. The lenses of animals that give a visual glow in the night are not more transparent for the short wave lengths than

those of other animals. While the transparency of the lens in the cat and the owl permits radiations to 3162 angstroms and 3085 angstroms respectively, in the rabbit and the dog complete absorption occurs at 3613 angstroms and 3403 angstroms respectively. The limit for the sensation of violet in the dark-adapted human eye is found between 3905 and 3714 angstroms. (Two plates, bibliography). Park Lewis.

Pitincart, E. **Traumatic aniridia and aphakia.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, July-Aug., p. 185. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Verhoeff, F. H. **An instrument simplifying the insertion of corneo-scleroconjunctival sutures in operations for cataract.** Amer. Jour. Ophth., 1934, v. 17, Jan., pp. 53-57.

10. RETINA AND VITREOUS

Bonnet, Paul. **Angioid streaks of the retina.** Arch. d'Opht., 1933, v. 50, Nov., p. 721.

This description of a typical case is accompanied by colored plates illustrating the appearance of both fundi. This patient was also afflicted with xanthoma elasticum of the skin. The writer agrees with Groenblad that the lesions of the skin and of the eyes are degenerative and related, and he assumes degeneration of the inner layers of the choroid so as to render its elastic membrane incapable of applying itself snugly to the curvature of the eye. The hemorrhages and macular lesions are viewed as secondary to disturbances produced by the cracks.

M. F. Weymann.

Denti, A. V. **Treatment of retinal detachment by Gonin's operation.** Boll. d'Ocul., 1933, v. 12, Jan., pp. 42-78.

Of twelve cases, six showed permanent recovery. They were in myopic eyes affected from a few days to two months at the time of operation. The writer emphasizes general examination of the patient for predisposing causes. (Bibliography, twelve figures.)

Melchiore Lombardo.

Deutschmann, R. **Two methods of treatment of detachment of the retina (one apparently opposite to diathermy) and remarks on the genesis of the retinal tear and its relation to the etiology of detachment.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 450.

Deutschmann reminds us that he has urged operative treatment of detachment of the retina since 1895. He now recommends the application of tincture of iodine and carbon dioxide snow at the site of the tear after one or two scleral openings as far as the choroid. The cold achieves the same effect as diathermy, but is less dangerous and simpler. A case is reported in which the tear did not precede but followed a fresh detachment and a case, also without a tear, in which the choroiditis created by carbon dioxide snow sufficed to remove the subretinal fluid.

C. Zimmermann.

Grave de Peralta, J. **Ophthalmic migraine of one year duration due to overlooked chronic nephritis ending fatally in uremia.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, May-June, p. 151.

In the course of two years the patient had been treated for headaches, and the glasses changed several times, when the writer discovered bilateral albuminuric neuroretinitis. The patient died in uremic convulsions three days later.

M. Davidson.

Kronfeld, P. C. **Function of the reattached retina.** Arch. of Ophth., 1933, v. 10, Nov., pp. 646-663.

Based on personal experience and the reports in the literature, the author concludes that the functional prognosis in cases of partial or complete macular detachments of less than two months' duration and also in partial macular detachment of more than two months' duration is favorable, and often disturbances become almost undetectable. Frequently the optimum vision is not reached for several weeks and occasionally a tritanopsia survives. Six cases are reported in which the function of the reattached retina was studied. In each there was a partial sector-shaped retinal detachment of more than one month's

duration which yielded to Gonin-Lindner or Weve diathermic operation. No definite signs of remote, permanent, noxious effects from uncomplicated operations were found. (Discussion.)

J. Hewitt Judd.

Kyrieleis, Werner. **The fundus oculi of leukemia.** Zeit. f. Augenh., 1933, v. 82, Nov., p. 15.

Kyrieleis believes that to the vasomotor phenomena, dilatation and tortuosity of veins, which are probably the earliest leukemic symptom in the eyeground, another factor must be added to bring about hemorrhage. This is probably the cellular constitution of the blood, although what the critical cell concentration is or which cell type is essential cannot be stated. It is the purpose of this essay to stimulate study of a large mass of material. Aplastic anemia may produce an eye ground picture similar to that of leukemia.

F. H. Haessler.

Lazarev, E. G. **Observations on detachment of the retina and its treatment by the procedures of Gonin, Sourdille, and Guist-Lindner.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 113.

The fact that retinal detachment is frequently secondary to choroidal disease should be kept in mind in planning all therapeutic as well as prophylactic procedures. Treatment of constitutional diseases such as syphilis or tuberculosis is to be instituted immediately. In two cases spontaneous reattachment followed rest in bed with both eyes bandaged. Of three cases operated upon according to Sourdille, one was cured, one improved, and one unimproved. In cases of three months' standing Gonin's operation is performed at the start. Of eleven cases operated according to Gonin five were cured permanently, four after one and one after two operations, while four cases were improved and two remained unimproved.

Ray K. Daily.

Lijo Pavia, J. **Cyanotic and polycythemic fundi.** Rev. Oto-Neuro-Oft., 1933, v. 8, March, p. 90.

Four cases of polycythemic cyanotic and four of polycythemic fundus have been observed and photographed by the writer. Only two of the writer's cases exhibited serious reduction of vision, one because of macular degenerative changes and the other because of angiosclerosis. Retinal edema due to non-inflammatory stasis was observed in all the eight cases. (Fundus photographs.)

M. Davidson.

Lijo Pavia, J. **Green color in fundus changes and lesions. Its pathologic significance.** Rev. Oto-Neuro-Oft., 1933, v. 8, June, p. 208.

In 1929 the writer, in doing color photography of the fundus, noted green spots which he regarded as due to retinal reflexes from the limiting membranes. In experimenting with autochrome plates without filters the green color is not scattered but is confined to borders of lesions and has been noted in macular lesions, in Fuchs' central black spot in myopia, traumatic choroidal ruptures, neuroretinitis albuminurica, retinal phlebitis, incipient luetic macular lesion, and in a case of Berlin's opacity. In the latter two cases the greenish color was seen in a consecutive series of photographs to disappear with the disappearance of the edema, except along the vessels where it is regarded as due to retinal reflexes. It has also been noted in the case of a retained iron particle, in a case of tuberculous sclerokeratitis, in retinitis pigmentosa, and in tuberculous iridocyclitis. Photography of the tapetum of the cat's eye proved the authenticity of the color reproductions. The fact that Lagleyze saw and painted the color, and that artists have recorded the color frequently when ophthalmologists ordering the pictures were unaware of it, indicates that the green color is real, and that ophthalmologists have simply not paid attention to it.

M. Davidson.

Lijo Pavia, J. **Hemorrhage in Cloquet's canal.** Rev. Oto-Neuro-Oft., 1932, v. 7, Dec., p. 500.

Preretinal hemorrhage accompanied by blood in the retrolental space was traced by slitlamp from the retrolental

space through the anterior third of the vitreous. The blood in the vitreous maintained an invariable position for ten days. (Color photographs of fundus and anterior segments.)
M. Davidson.

Lijo Pavia, J., and Dusseldorp, M. **Retinal phlebitis and hemorrhages in the tuberculous.** Rev. Oto-Neuro-Oft., 1933, v. 8, Jan., p. 7.

In two cases the initial stages were observed and photographically recorded. The acute stages are characterized by edema around the vein, with blurring of its margins, pallor, and ectasia and darker color proximally. Eventually the vein is either sclerosed or ruptures. One case was cured, the other uninfluenced, by tuberculin therapy. (Illustrated.) M. Davidson.

Meksina, F. M. **An anomaly of the fundus.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 201.

Because the author could not find a similar description in the available literature, she reports myelin fibers which in form, size, and arrangement of blood vessels gave the impression of a second optic disc above the real one. (One drawing.) Ray K. Daily.

Meksina, F. M. **Tuberculosis of the posterior segment of the eyeball and its treatment.** Sovietskii Viestnik Opht., 1933, v. 2. pt. 2, p. 152.

Tuberculosis of the fundus is differentiated from syphilis by the absence of or late appearance of pigment which in syphilis appears early. Visual disturbances due to involvement of the retina occur early in syphilis and late in tuberculosis. In the absence of an active pulmonary lesion tuberculin should be used in all cases in which other etiological factors are excluded.
Ray K. Daily.

Nicolato, A. **Retinal angioma and cerebral angioma.** Ann. di Ottal., 1933, v. 61, Oct., p. 736.

A man of twenty-five years had an attack of sensory hemiplegia, and three months later an attack of intense sweating, severe pain in the top of the head, and dizziness. The left eyeball protruded more than the right. This was followed by transitory diplopia, and later intense cephalalgia. There were stigmata of degeneracy. The right nasal field was completely abolished, the left vision greatly reduced. Fundus examination showed vascular anomalies. In one place the vein seemed to be joined directly to the artery, forming a racemose aneurism of the retina. The literature is fully discussed. (One plate with color design, bibliography.)
Park Lewis.

Redslob. E. **Contribution to the pathological anatomy of retinitis pigmentosa.** Ann. d'Ocul., 1933, v. 170, Dec., pp. 1040-1056.

Does the disease arise in retina or choroid, and what is the mechanism of penetration of pigment into the retina? Much anatomical material has been available and a review of the literature shows general agreement that the outstanding change is loss of rods and cones. The author's case showed proliferation of connective tissue from the innermost layer of the choroid, nearest the retina. This he believes indicates an inflammatory basis. This proliferated tissue pushes cells of the pigment layer into the retina. The condition should be termed chorioretinitis pigmentosa. H. Rommell Hildreth.

Spinelli, F. **The arterial pressure of the retina and its relation to intracranial hypertension.** Riv. Oto-Neuro-Oft., 1933, v. 10, May-June, pp. 345-380.

The author's three groups of intracranial lesions include eleven cases of brain tumor and eleven cases of serous meningitis or intracranial hypertension of unknown origin. The author concludes that solitary hypertension of the retinal artery is a symptom of intracranial hypertension and supports early diagnosis of the latter or more definite diagnosis in doubtful cases. (Bibliography.) Melchiore Lombardo.

Velhagen, K., Jr. **Our localization perimeter.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 583. (Ill.)

While the eye looks at the fixation point of the perimeter, it is examined

by indirect ophthalmoscopy from the arc of the perimeter. When the retinal tear appears in the center of the image, the degree and meridian of the mirror hole are noted. The results were satisfactory in more than two hundred eyes operated upon. C. Zimmermann.

Walker, C. B. **Retinal detachment. Technical observations and new devices for treatment, with a specially arranged diathermy unit for general ophthalmic service.** Amer. Jour. Ophth., 1934, v. 17, Jan., pp. 1-17.

Weekers, L., and Hubin, R. **Hemorrhagic neuroretinitis of dental origin.** Arch. d'Opht., 1933, v. 50, Nov., p. 751.

The postmortem findings of Moczar in twenty-two cases of acute dental infection are discussed. In a case of unilateral hemorrhagic neuroretinitis, marked and immediate improvement occurred after removal of chronically infected teeth on the same side as the ocular lesion. Similar case reports by Terson and Michaux are quoted. The writer believes the hemorrhagic neuroretinitis to be a direct result of the infected teeth in the reported cases.

M. F. Weymann.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Busacca, A. **Three cases of papilledema of difficult interpretation.** Riv. Oto-Neuro-Oft., 1933, v. 10, May-June, pp. 307-325.

A man of thirty-five years, with headaches, marked visual defect, and binasal hemianopsia, showed bilateral papilledema and edema of the right macular region, with a cherry red spot. The sella was deformed and Wassermann positive. Some symptoms improved, others disappeared, after antiluetic treatment. The diagnosis was probable gumma of the pia of the optic nerve, compressing the central artery of the right eye. A six-year-old boy showed large rigid pupil and bilateral papilledema. Blood Wassermann was doubtful and spinal fluid negative. His father was luetic. The symptoms partially improved, and some vision came back after antiluetic treatment. The author regards luetic lesion of the chiasm or optic nerves, acting with acute hydrocephalus, as the cause of these symptoms. A man fifty-seven years of age was blind in the right eye from postneuritic optic atrophy. His left eye showed papilledema with vision 1/10 and the visual field was concentrically contracted. Radiography showed an opaque mass in the frontal region, which was interpreted as gumma. (Bibliography.)

Melchiore Lombardo.

Del Duca, M. **New pathogenetic theory of papilloretinal lesions in pernicious anemia and the leukemias.** Riv. Oto-Neuro-Oft., 1933, v. 10, July-Aug., pp. 438-459.

Since in pernicious anemia and the leukemias papillary and peripapillary edema is present as in serous meningitis, an expression of increased intracranial pressure, the author thinks that the former and the latter diseases have the same pathogenesis. In five patients affected by pernicious anemia and four others affected by lymphatic or myelogenous leukemia, the cerebrospinal pressure was found constantly increased. The neuro-anemic syndrome results from toxins not yet known, which act on the central nervous system, the choroid plexuses, and ventricular ependyma. (Bibliography.)

Melchiore Lombardo.

Hartung, F., and Alvaro, M. E. **Mastoiditis and retrobulbar neuritis.** Rev. Oto-Neuro-Oft., 1933, v. 8, April, p. 123.

Considerable recovery of vision in an alleged blind right eye suffering from trachomatous corneal scars followed mastoidectomy on the left. X-ray revealed a dehiscence of the right sphenoidal sinus roof. The patient's vision improved from 1/80, when first seen five days after operation, to 1/30 two weeks later. Media and fundus, aside from corneal opacities, were normal. Focal infection from the mastoiditis or the sphenoiditis is assumed.

M. Davidson.

Lijo Pavia, J. **Papilledema. Various aspects of its evolution and changes in its usual ophthalmoscopic color.** Rev. Oto-Neuro-Oft., 1933, v. 8, June, p. 213.

The writer has abandoned the use of the filter in color photography of the fundus because it alters the true color of the fundus. Three cases of papilledema were studied at their height and during the subsidence, one under radium treatment and two after decompressions; and all three exhibited dominance of peripapillary green discoloration at the height of the edema and its disappearance after subsidence.

M. Davidson.

Lugli, L. **The ocular lesions in serous meningitis.** Riv. Oto-Neuro-Oft., 1933, v. 10, July-Aug., pp. 411-428.

A married woman of seventeen years had fatal serous meningitis after rachianesthesia. Ocular symptoms were bilateral optic neuritis, peripillary edema, marked congestion of retinal blood vessels, and hemorrhages. Histologically the article is an interesting contribution to the pathogenesis of serous meningitis and to the eye pathology in this affection. (Five figures and literature.) Melchiore Lombardo.

Marchesini, E. **Transillumination of the sphenoidal sinus and optic canals.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 575.

Marchesini studied the morphology of the sphenoidal sinuses and optic canals in 102 crania by transillumination and photography in a dark room, measuring the sinuses and optic canals and their relationship to one another. The cases are arranged in decade groups. A very great variety of shapes and sizes of sinuses was demonstrated and a frequent thinning of the walls of the optic canals. (Ten illustrations.)

Eugene M. Blake.

Schmelzer, H. **Unilateral choked disc and disturbed sense of smell.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 479.

A man aged forty-three years had choked disc of the right eye, and also right hyposmia and left anosmia. This suggested a condition similar to the syndrome of Foster-Kennedy (unilateral choked disc and simple optic atrophy of the other eye due to tumor of the frontal lobe of that side), although optic atrophy or retrobulbar neuritis of the left eye was not demonstrated. A roentgen shadow of the left olfactory sulcus increased the suspicion of tumor of the left frontal lobe, and extirpation of a ganglioglioma confirmed the diagnosis. The author urges the importance of testing the sense of smell in cases of unilateral papillitis.

C. Zimmermann.

Terry, T. L., and Dunphy, E. B. **Metastatic carcinoma in both optic nerves simulating retrobulbar neuritis.** Arch. of Ophth., 1933, v. 10, Nov., pp. 611-614.

The authors state that this condition has not previously been reported. Records of only five cases of metastasis to the optic nerve or its sheaths were found. A man aged twenty-seven years had first noticed failing vision in the left eye three weeks before. The right began to fail and blindness was complete within two weeks. Deafness developed in the left ear and numbness on the left side of the nose and lower part of the spine. The ophthalmoscopic picture was that of acute retrobulbar neuritis. Signs of meningitis were present. Death occurred twenty-eight days after admission. Necropsy showed general carcinomatosis with the primary lesion probably in the lungs. The involvement of the optic chiasm, optic nerves, and meninges is shown in a diagrammatic sketch. The absence of gross papilledema is attributed to partial obliteration of the intervaginal space. J. Hewitt Judd.

12. VISUAL TRACTS AND CENTERS

Busacca, A. **Tumors of Rathke's pouch. Clinical and histologic study.** Riv. Oto-Neuro-Oft., 1933, v. 10, May-June, pp. 327-344.

An undersized girl of seventeen years, affected by amenorrhea and hypoplasia of sexual basis, had been affected for about two months with frontal headaches, drowsiness, general asthenia, and psychic disturbances.

Examination showed bilateral paresis of the abducens, left exophthalmos, bilateral mydriasis with sluggish pupillary reactions, very marked defect of vision in both eyes, absence of the right temporal nasal field, and bilateral papilledema. Radiography and ventriculography showed signs of increased intracranial pressure, compression of the lateral ventricles, and a calcified suprasellar mass. At post-mortem examination this mass was found to be a policystic neoformation surrounded by meninges. Under the basal nuclei was also found a cystic cavity which pushed forward the right tract and optic nerve. Histologically the cyst appeared to be lined by cylindric epithelium springing from Rathke's pouch. (Bibliography.)

Melchiore Lombardo.

Cardillo, F. **Clinical and radiologic remarks on a case of Erdheim's tumor.** Riv. Oto-Neuro-Oft., 1933, v. 10, May-June, pp. 265-278.

A woman forty-one years of age, blind of both eyes, showed bilateral exophthalmos more marked on the left. The sella was enlarged and the Wassermann negative. Histologic examination of a mass present in the left nasal cavity showed it to be an Erdheim tumor. Apparently it had originated in the hypophyseal duct and had spread to the middle cranial fossa and the upper pharynx. The symptoms disappeared under radiotherapy. (Nine figures, bibliography.)

Melchiore Lombardo.

Poppi, U. **The oculogyral tracts.** Riv. Oto-Neuro-Oft., 1933, v. 10, July-Aug., pp. 401-410.

Examination of serial sections of the brain of six apes of different kind, whose physiology is very similar to that of man, shows that the aberrant cortico-protuberantial fibers of the pyramidal tracts are absent in some of these brains or vary in course in the others; and indicates that the oculogyral and then the cephalogyral functions are not accomplished through these tracts. The pyramidal tract, phylogenetically recent, is in man extremely inconstant and in apes either absent or poorly represented. (Five figures.)

Melchiore Lombardo.

Vazquez Barrière, A., and Medoc, J. **Two cases of chiasmal syndrome due to tumor.** Rev. Oto-Neuro-Oft., 1933, v. 8, Feb., p. 39.

One suprasellar and one infrasellar case are reported. The importance of using small test objects and of examination of color fields is stressed. The "quadrant sign" was helpful in localization of the two cases reported, but ischemia from interference with blood supply rather than direct compression of the chiasm is considered the more likely factor in this sign. Wernicke's hemiopic pupillary reaction was present in both cases. (Illustrated.)

M. Davidson.

13. EYEBALL AND ORBIT

Beigelman, M. N. **Actinomycosis of the orbit.** Arch. of Ophth., 1933, v. 10, Nov., pp. 664-673.

A man of forty-five years developed exophthalmos of the right eye with swelling of the lids four months after a large granuloma had developed in the right preauricular area. The orbital condition resisted all therapy for two years, the increasing proptosis necessitating tarsorrhaphy. Low grade meningitis and brain abscess caused death. At autopsy the orbital fat was found largely replaced by granulomatous tissue, and the nerve sheaths and interstitial septa were infiltrated with small lymphoid cells. The ray fungus was found in some sections. All reported cases are summarized as to sex, age, occupation, probable place of entry, duration, cause of death, and autopsy observations indicating route of cranial involvement. Treatment is still very unsatisfactory, but should include potassium iodide and minor surgical procedures for drainage.

J. Hewitt Judd.

Hamby, W. B., and Gardner, W. J. **Treatment of pulsating exophthalmos.** Arch. of Surg., 1933, v. 27, Oct., p. 676.

The authors discuss treatment for intracranial arteriovenous aneurism, including ligation of the involved artery

proximal to the fistula, ligation both proximal and distal to the aneurism, ligation of all arteries and veins involved in the lesion, and direct closure of the fistula. Before operating by any method, a period of preliminary carotid compression must be instituted to encourage collateral circulation through the circle of Willis and to accustom the ipsilateral cerebral hemisphere to changes in arterial blood pressure. Two cases are presented in detail. (Four figures, eight references.)
Ralph W. Danielson.

Lumbroso, U. **Three cases of metastatic endophthalmitis.** Rassegna Ital. d'Ottal., 1933, vol. 2, July-Aug., p. 628.

In one case the cause was puerperal sepsis, the second followed an ear infection, and the third complicated cerebrospinal meningitis. All the cases were studied clinically, bacteriologically, and histologically. The author supplies a rapid review of the literature of the subject from 1922, when Seguini brought the matter to date. Lumbroso subscribes to the thromboembolic theory, with the phenomena of vasodilatation and vasoconstriction produced by exotoxins and endotoxins of the bacteria. (Two illustrations.)
Eugene M. Blake.

Padovani, S. **Syndrome of Hand-Schüller-Christian.** (Clinical contribution.) Arch. di Ottal., 1933, v. 40, June, p. 287.

A child seven years of age showed classical signs found in this condition, namely diabetes insipidus, exophthalmos, and alterations of the bones. The author reproduces two roentgenograms showing involvement of the bones of the orbits. Herman D. Scarney.

Sobol, I. **Improvement in exenteratio orbito-sinusalis-extra-orbitalis.** Riv. Oto-Neuro-Oft., 1933, v. 10, May-June, pp. 255-264.

The author does exenteration of the orbit for malignant tumors according to a modified Filatow method, using local instead of general anesthesia and omitting the tampon of the rhinopharyngeal cavity. One incision surrounds the orbit, another runs from the nasal side of this incision to the lip. The anterior and inferior walls of the frontal sinus and its mucous membrane, two-thirds of the zygomatic bone, and the anterior and external walls of the antrum with its mucous membrane are removed, as well as the frontal process of the maxillary bone and the ethmoidal cells of the same side. The optic nerve is cut, the orbital contents removed, and the external and inferior walls of the orbit destroyed. (Two figures, bibliography.) Melchiore Lombardo.

14. EYELIDS AND LACRIMAL APPARATUS

Blaskovics, L. de. **Artificial ptosis for protection of the cornea.** Ann. di Ottal., 1933, v. 61, Oct., p. 763.

The various methods of tarsorrhaphy limit the palpebral aperture in two directions, vertically and laterally. This makes the opening too narrow and too short. An operation is described in which the levator palpebrae is divided and the parts separated by sutures, producing lagophthalmos for the relief of xerophthalmia. A plastic transplant is used in the lower lid in cases of ectropion. This method protects the cornea without distorting the lid. (One plate.)
Park Lewis.

Fazakas, A. **Transplantation of the tear point as operative method against epiphora.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 508. (Ill.)

The different kinds of displacement of the tear point and the operative procedures for their correction are described and illustrated.
C. Zimmermann.

Schmelzer, Hans. **A peculiar case of "botryomycosis" (granuloma teleangiectaticum) of the lid.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 470. (Ill.)

Eight days after a kick from a cow, a boy aged twelve years developed red spots on the left lower lid. Within a week these grew to raspberry-shaped tumors diagnosed as botryomycosis. They were not real tumors (blastomas), but inflammatory granulomas of unknown origin (not botryococci, so-

called). Hence the term botryomycosis ought to be changed to granuloma angiectaticum. C. Zimmermann.

Valière-Vialeix. **Chronic conjunctivitis provoked by concretions of the canaliculi.** Ann. d'Ocul., 1933, v. 170, Dec., pp. 1030-1039.

Two cases are detailed. Mucous discharge was moderate. There was no tearing. The canaliculi were easily probed and the sac did not resist irrigation. In one case a small tumefaction developed near the lower punctum. The canal was slit, and a concretion removed from the bend. In the second case also a concretion was removed. Both cases recovered within a few days although they had resisted all previous treatment. H. Rommel Hildreth.

Venco, L. **The presence of "lysozyme" in the tears.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 519-552.

The author examined the lacrimal secretion of a large number of normal eyes and those with pathological changes, as to the presence of "lysozyme. Using the micrococcus lysodeicticus as an indicator, complete lysis occurred in a dilution of 1 to 1,000,000 and beginning lysis in dilutions from 1 to 1,000,000 to 1 to 2,000,000. External inflammatory conditions, especially those accompanied by epiphora, such as conjunctivitis, show a diminution of the lysozyme, while diseases of the deeper structures of the eye show little change. Generalized pathological changes of the body cause a lowering of this property of the tears. The principal function of lysozyme is to aid in the destruction of the saprophytes which deposit themselves upon the conjunctiva, thus aiding the mechanical action of the tears in freeing the conjunctival sac of bacteria.

Eugene M. Blake.

15. TUMORS

Chance, Burton. **Sarcoma of choroid in a shrunken globe exhibiting fibrous formation about the tumor.** Amer. Ophth. Soc., 1933, v. 31, pp. 181-186; and Amer. Jour. Ophth., 1934, v. 17, Jan., p. 48.

Cheglova, A. **Congenital neoplasms of the conjunctiva.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 165.

Following a discussion of the various classifications of these growths the article contains reports of a pigmented nevus, a papillomatous nevus, a dermoid, a fibrolipoma, a teratoma, and an angioleiomyoma. Ray K. Daily.

De Vincentiis, G. **Three cases of leucosarcoma of the uveal tract.** Boll. d'Ocul., 1933, v. 12, Jan., pp. 22-41.

The tumors were in a boy of five years, and women of forty-two and seventy years. Microscopic examination revealed no pigment except a few granules here and there. The author discusses the genesis of uveal leucosarcoma and the transformation of leucosarcoma into a melanosarcoma. (Bibliography, three figures.)

Melchiore Lombardo.

Freyler, Heinrich. **Experience with Gutmann's piezometer.** Zeit. f. Augenh., 1933, v. 82, Dec., p. 127.

The piezometer was designed to aid in diagnosis of retrobulbar tumors by measuring the degree to which an exophthalmic eye could be pushed back into the orbit. The author presents a few examples from a small series of measurements. It is not possible to differentiate one tumor from another, nor always with certainty to distinguish neoplasm from edema or inflammatory infiltration. F. H. Haessler.

Hardy, G., and Hardy, W. F. **Preliminary report on orbital tumors.** Amer. Jour. Ophth., 1934, v. 17, Jan., pp. 18-21.

Jessel, Erwin, **The clinical manifestations and therapy of intraorbital tumors.** Zeit. f. Augenh., 1933, v. 82, Nov., p. 31.

Eighteen cases of intraorbital tumor from the University Clinic in Berlin are presented. Two were found histologically to be neurinoma. Exophthalmos was noted in every case, diplopia

only six times, choked disc twelve times. The difference in degree of swelling of various parts of the nerve head was striking. Transient folding of the retina occurred four times. Surgical treatment seems to be more effective than radiation alone.

F. H. Haessler.

Merrill, R. H. **Rare ophthalmoscopic findings in sarcoma of the choroid.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 598. (Ill.)

In the first case a flat or diffuse sarcoma retained this type for over four years. Since scleral transillumination did not show any shadow on account of the position of the tumor at the posterior pole, indirect transillumination from the oral cavity would have been proper. The diagnostic difficulty in the second case arose from unusually intense retinal pigmentation of the central area, with hemorrhages and white foci. C. Zimmermann.

Papolczy, Franz. **The clinical aspect, pathology, and therapy of epibulbar squamous-celled epithelioma.** Graefe's Arch., 1933, v. 131, p. 32.

In the last twenty-five years forty-three cases of epibulbar squamous-celled epithelioma appeared at the First Eye Clinic at Budapest. During the same interval, five times as many eyes were removed because of uveal sarcoma. After removal of the carcinoma from the retained eyeball in eighteen cases, there was no recurrence. In eight cases the eyeball was preserved and a cure resulted after one to several recurrences. In seven cases enucleation or exenteration of the orbit was necessary after several recurrences. In ten patients enucleation or exenteration of the orbit was immediately undertaken because of size or infiltrative character of the growth. In four cases there was a definite association and in two others apparent connection of the carcinomatous development with pterygium. In four cases invasion of sclera or cornea progressed to penetration of the fibrous wall of the eyeball near the corneoscleral junction. After perforation the tumor cells extended into the base of the iris, the spaces of the ligamentum pectinatum, or the anterior part of the ciliary body. H. D. Lamb

Vail, D. T., Jr. **Mixed (teratoid) tumors of the lacrimal caruncle.** Arch. of Ophth., 1933, v. 10, Nov., pp. 593-601.

After summarizing the literature and pointing out the extreme rarity of the condition, the author lists the various types of tumor and pseudotumor of the caruncle previously reported. He reports the case of a man aged twenty-four years, in whom a mixed tumor was attached to the lateral margin of the caruncle. Present for many years, it had grown rapidly for the preceding three weeks. It was excised and had not recurred after three years. Pathological examination revealed a mixed tumor composed of "fibrous tissue, adipose tissue, smooth muscle, sebaceous glands, and hair follicles". These tumors are congenital, but mechanical irritation, trauma, or inflammation may cause sudden growth of the tumor. (Photograph, three photomicrographs, bibliography, discussion.)

J. Hewitt Judd.

Velhagen (Chemnitz). **Leiomyoma of the ciliary body.** Klin. M. f. Augenh., 1933, v. 91, Oct., p. 456. (Ill.)

Between the ciliary processes of the left eye, a woman aged fifty-seven years had a leiomyoma which had displaced the cataractous lens backward. The eye was enucleated, and a histological description is given with a review of the literature. C. Zimmermann.

Vosnesenskaia, A. L. **A case of late development of retinal glioma.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 202.

The growth was found in an eyeball enucleated from a woman of twenty years, with the diagnosis of intraocular neoplasm. The large tumor was located principally between the sclera and choroid in the temporal portion of the eyeball. Histologically the center of the tumor consisted of astrospongiocytes

and astrocytes with some cells attached to the vascular walls. Peripherally there were numerous fibers, undifferentiated epithelial cells, and spongioblasts. Ray K. Daily.

Zeitler, Maria. **Clinical observations on epibulbar tumors.** Zeit. f. Augenh., 1933, v. 82, Nov., p. 3.

Fourteen epibulbar new growths observed at the Kiel clinic are described with five illustrations, one in color. The first two belonged to the class of new growth called euthelioma by Steinhart. Clinically they had the appearance of foam overlying the conjunctiva near the limbus and a delicate veil covered part of the cornea. Microscopically the foamy structure consisted of layers of epithelium with papillae which invaded without destroying the corneal structures. Two tumors had the clinical and microscopic characteristics of papilloma. One of them, a cauliflower-like mass, did not recur after abcission and cautery. The other recurred repeatedly after radiation but not after abcission. Two benign tumors of the caruncle are described. The seventh of the series was a large mass that covered most of the eyeball, and was divided into two parts by a deep cleft. On one side of the cleft the tumor was carcinoma, on the other papilloma. After six months metastasis was found in the orbit, and despite exenteration the patient died six months later. The eighth patient had been operated on for pterygium several times at the side of the tumor. Enucleation was refused until extensive recurrence after abscission. Histologically typical carcinoma was found.

Pigmented epibulbar masses, although traditionally called melanosarcoma, mostly arise in a nevus which is epithelial. The first of these observed by the author seemed unpigmented clinically but histological preparations revealed typical melanocarcinoma. In a second instance it was clear from microscopic study that the tumor was a true melanosarcoma. In two further cases the tumors were primary in the ciliary body and had perforated the sclera. F. H. Haessler.

16. INJURIES

Avizonis, P. **Migration and spontaneous evacuation of intraocular foreign bodies.** Sovietskii Viestnik Opht., 1933, v. 2, no. 1, p. 79.

Twenty-two days after a penetrating injury a small metal particle found its way from the globe through a spontaneous opening at the limbus. This event was preceded by severe iridocyclitis with considerable exudation into the anterior chamber. The resulting visual acuity was 1.0. In another case, eight months after an explosion, the foreign body was found slightly protruding through the original scar. With a forceps a piece of wood 5 by 15 mm. was removed. The eyeball was at that time in a state of incipient atrophy.

M. Beigelman.

Biondo, M. d'A. **Ocular lesions from asphalt.** Rassegna Ital. d'Ottal., 1933, v. 2, July-Aug., p. 659.

Biondo contributes a clinical and experimental study of the effects of the natural bituminate of asphalt, so much used in road making and the rubber industry. Animal eyes were studied biomicroscopically and histologically. The action upon the ocular coats is limited to chemical and mechanical irritation which does not lead to permanent or serious effects. The irritant factors are the impure inorganic and organic parts of the asphalt. Two cases in human eyes are reported.

Eugene M. Blake.

Blegvad, Olaf. **Hole at the macula.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1932, pp. 16-17. In Hospitalstidende, 1933, Sept. 14.

A patient of thirty-two years, while at work with a circular saw, was hit in the right eye by a flying piece of wood. At examination the vision of this eye was found to be 6/24. A round hemorrhagic spot about one-fourth the diameter of the disc was seen at the macula. In the course of two months vision improved to 6/18, and the hemorrhagic spot was replaced by a sharply defined, oval hole at the macula.

D. L. Tilderquist.

Bourborn, O. P. **Severe eye symptoms due to dyeing the eyelashes.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 11, p. 1559.

One case is reported in which marked swelling, aching and burning of the eyes, and thick discharge developed twenty-four hours after dyeing the eyelashes with a dye called "Godefroy's French coloring for hair and beard". The condition responded gradually to holocaine, hot compresses of magnesium sulphate, and 0.5 percent zinc sulphate ointment. George H. Stine.

Brugger, Wolfgang. **Hoe splinter injuries of the eye in the territory about Lake Constance.** Zeit. f. Augenh., 1933, v. 81, Oct., p. 319.

Typical penetrating wounds result from splinters flying from the agricultural hoe, and are associated with definite geological conditions such as are found in the terminal moraines of the last glacial advance in the Rhine valley about Lakes Zurich and Constance. Here the pebbles are harder than iron.
F. Herbert Haessler.

Castresana, B., and Castresana, A. **Indirect scleral ruptures with subconjunctival luxation of lens in both eyes from same type of accident.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, March-April, p. 84.

At an interval of several years the patient sustained indirect upper scleral ruptures in either eye as the result of blows from a fist. In the second accident the result was aniridia and aphakia. In the other the lens and upper iris were prolapsed through the wound. (References.)
M. Davidson.

Fledelius, M. **Traumatic iridodialysis.** Acta Ophth., 1933, v. 11, no. 3, p. 302. (See Amer. Jour. Ophth., 1934, v. 17, Jan. p. 94.)

Grave de Peralta, J. **Perforating injury with sympathetic reaction. Conservative surgery with satisfactory results.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, July-Aug., p. 214.

A patient with a perforating corneal injury involving iris and lens exhibited on the eighth day sympathetic irritation of the fellow eye. Enucleation was objected to by the patient, and conservative surgery, in the form of paracentesis, iridectomy, and lavage of the anterior chamber, was resorted to with immediate relief of the sympathizing eye and conservation of the offending eye. Antidiphtheric serum was also used before and after intervention.
M. Davidson.

Harner, C. E. **Dermato-ophthalmitis due to eyelash dye Lash-Lure.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 11, p. 1558.

Three cases of inflammation of the eyes due to the application of an eyelash dye called Lash-Lure are reported. Patient number one had two distinct, severe reactions four years apart and also developed a localized dermatitis when using a dye on other patrons of a beauty shop in which she was an operator. In the second case swelling of the lids, conjunctivitis, and later ulcers on the lower margin of each cornea developed within a few hours after application of the dye. The condition subsided after one and a half months' treatment. The corneal ulcers had entirely healed, but fairly large leukomas remained. The vision was: right, 6/60; left, 6/7.5. The third patient developed the usual dermato-conjunctivitis three days after use of Lash-Lure. The corneas and irides were normal. The condition cleared entirely after one week of treatment. George H. Stine.

Heine, L. **Remarks on the question of compulsary submission to operation in cases of compensable injury.** Zeit. f. Augenh., 1933, v. 82, Nov., p. 1.

Heine favors making it obligatory to accept operations on the extraocular muscles. But modern operations for retinal detachment should not be made obligatory. F. H. Haessler.

Hilscher, V. **Contribution to cases of lightning cataract.** Klin. M. f. Augenh., 1933, v. 91, Nov., p. 610. (Ill.)

A man aged twenty-three years was struck by lightning on June 30, 1931, with loss of consciousness for half an

hour, burns on the forehead, the left face, the back, and the extremities, and swelling of the lids. On the tenth day he complained of hazy vision and photophobia. In December vision had regained its former strength, but it gradually deteriorated again. On March 9, 1932, both lenses showed subcapsular opacities, mostly posterior. These gradually progressed into the nucleus. Six months later the cataract of the right eye was removed after discission, with resulting corrected vision of 5/4. The literature is reviewed.

C. Zimmermann.

Jamison, R. C. **Eyelash dye (Lash-Lure) dermatitis with conjunctivitis.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 11, p. 1560.

In a woman aged forty years, the eyelids became red, swollen, and irritated, and a conjunctivitis developed, three days after application of an eyelash dye (Lash-Lure). The usual bland applications were followed by improvement during the next two weeks, but at the end of that time the eyelids and adjacent skin areas again developed acute inflammation accompanied by conjunctivitis. The entire clinical picture at that time resembled dermatitis venenata. Sensitization tests proved negative to everything except Lash-Lure. The condition persisted for two months with alternate periods of improvement and relapse, and finally yielded to persistent protection of the skin and the use of bland and soothing preparations. George H. Stine.

Lipovitsch, N. A. **A case of a foreign body remaining in the crystalline lens for ten years.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 205.

A man of twenty-two years complained of haziness of vision in the right eye, which had been injured in an explosion ten years previously. Under slitlamp illumination a star-shaped, greyish capsular opacity was found in the center of the pupil, and in the upper outer quadrant of the lens was a scintillating foreign body. The foreign body had evidently entered the lens peripherally, adhesion to the iris shutting off the entrance of aqueous.

Ray K. Daily.

Lurie, S. **Traumatic cysts of the anterior segment of the eyeball.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 142.

The author reports three cases, with microscopic findings in two. The possibility that such epithelial cysts may develop years after injury and lead to the loss of the eye should be kept in mind in estimating compensation in workers. Ray K. Daily.

McCally, A. W., Farmer, A. G., and Loomis, E. C. **Corneal ulceration following use of Lash-Lure.** Jour. Amer. Med. Assoc., 1933, v. 101, Nov. 11, p. 1560.

In a woman of thirty-eight years, marked irritation of both eyes immediately followed dyeing of the eyebrows and eyelashes with Lash-Lure. There was a marked edematous dermatitis of the face, forehead, and lids, and a severe conjunctivitis. Two areas on the left cornea showed denudation, while the right was stippled over its entire area. The pain was severe. The corneal ulcers gave considerable trouble. Three weeks after onset of the eye condition a generalized bright red papular dermatitis began to appear on the body. A few days later there was an elevation of the tension in both eyes and the corneal ulcers which had been improving became somewhat necrotic. The condition finally quieted down. There was a large dense opacity of the right cornea and a large dense opacity in the lower half of the left. Most striking was the intense edema, particularly of cornea, ciliary muscle, and iris. There was simply a disintegration of the corneal stroma. The hypopyon ordinarily seen in the presence of such marked corneal changes due to bacterial invasion was absent.

George H. Stine.

Plitas, P. C. **Ocular injuries with iron splinters in the metallurgical industry.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 253.

From experimental injuries on enu-

cleated eyes the author concludes that fine iron particles combustible in the air have no tendency toward deep penetration of the cornea. More dangerous relative to penetration are small particles of emery and steel. A careful study of the mechanism of these injuries should lead to development of effective prophylactic measures. Ray K. Daily.

Saburov, G. I. **Roentgenography of intraocular foreign bodies.** Sovietskii Viestnik Opht., 1933, v. 2, pt. 2, p. 186.

The author reviews briefly the roentgenographic procedures in use and describes a comparatively simple method which serves him well. As an indicator he uses the metallic electrode of the ionization apparatus. This is applied to the center of the cornea and exposures in various directions permit accurate localization of the foreign body.

Ray K. Daily.

Schenk, F. **On the kind, origin, and frequency of eye injuries in the newborn.** Med. Klin., 1933, v. 29, Oct. 20, pp. 1433-1435.

The author found injuries of the eyes to the newborn twenty-nine times in 27,000 deliveries. Eight cases after spontaneous delivery included subconjunctival, retinal, and choroidal hemorrhage, and detachment of the retina. Ecbolics seemed to play no part in the occurrence of these birth injuries. The relation between time of rupture of membranes and birth seemed to be a factor in retinal hemorrhage. The author concludes that eye injuries could be reduced if caesarean section were used more frequently in cases of narrow pelvis. Beulah Cushman.

Tooker, C. W. **Epithelial cyst in the posterior chamber. Clinical history and microscopic anatomy of enucleated eye.** Amer. Ophth. Soc., 1933, v. 31, pp. 187-193; and Amer. Jour. Ophth., 1934, v. 17, Jan., p. 41.

Zakrevskaia, E. I. **Ocular injuries in the metallurgical industry.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 264.

A statistical study shows a diminution in the percentage of eyes lost following magnet extraction of foreign bodies, and a greater percentage of eyes with good vision in 1931 as compared with statistics of former years; this is accounted for by prompt and more skilled treatment. The Leningrad Ophthalmologic Institute offers a course on this subject to the medical personnel of industrial establishments.

Ray. K. Daily.

17. SYSTEMIC DISEASES AND PARASITES

Dedimos. **The pathogenesis of photopsias and of ophthalmic migraine.** Arch. d'Opht., 1933, v. 50, Oct., p. 677. (See Section 3, Physiologic optics, refraction, and color vision.)

G. G. Loginov. **Ten surgically treated cases of intraocular cysticercus.** Sovietskii Viestnik Opht., 1933, v. 2, no. 1, p. 5.

Intraocular cysticercus is a comparatively frequent disease in the district of Ural. In four years the author observed fourteen cases, of which nine were operated upon. Removal of the cysticercus is followed by satisfactory functional results only if performed at the earliest possible time. Active iridocyclitis, particularly with exudate into the anterior chamber, should be considered a contraindication to surgical interference. In the vitreous the cysticercus is better tolerated than under the retina, but localization of the parasite and its removal are much simpler in subretinal cysticercus. In a footnote the editors take exception to several statements made by Loginov, including his interpretation of the uveal reaction in intraocular cysticercus as proliferative uveitis of a type closely related to sympathetic ophthalmia.

M. Beigelman.

Meksina F. M., and Chaiutina, I. M. **Ocular complications of posterior paranasal sinusitis.** Sovietskii Viestnik Opht., 1933, v. 2, no. 3, p. 275.

A case of bilateral retrobulbar neuritis with large absolute central scotomata gradually recovered within three months following opening of the posterior paranasal sinuses without

demonstrable pathology. A case of bilateral intrabulbar neuritis recovered following opening of the paranasal sinuses, the only demonstrable pathology of which was a slight hyperemia of the mucous membrane. The author concludes that "sinusitis without inflammation" should be diagnosed by exclusion of other etiologic factors, and the sinuses promptly opened.

Ray. K. Daily.

Penfield, W. **Operative treatment of migraine and observations on the mechanism of vascular pain.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 50.

Unilateral migraine can be cured by radical neurectomy. The neurological mechanism involved may perhaps be similar to that which the author believes obtains in angina and probably other forms of referred pain. That is, an autonomic nerve being stimulated by some focal irritation serves to reflect the stimulus to the periphery at a distance by means of an axone reflex. The pain sensation is then carried to consciousness along the cerebrospinal sensory nerve which innervates the peripheral part in question. Two case reports in which subtotal rhizotomy of the fifth nerve relieved the pain are given. (Nine figures, bibliography.)

George H. Stine.

Pepper, O. H. P. **Hematology and the blood dyscrasias in relation to diseases of the eye, ear, nose, and throat.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 28.

The author gives a general consideration of the normal and abnormal blood picture, the origin of symptoms of blood dyscrasias, individual dyscrasias, and the hematology of infection.

George H. Stine.

Rabinowitch, I. M. **Diseases of the eyes, ears, nose, and throat from the metabolic point of view.** Trans. Amer. Acad. Ophth. and Otolaryng., 1932, 37th annual meeting, p. 62.

Laboratory methods play a helpful rôle in both diagnosis and treatment in ophthalmology and otolaryngology. Specific reference is made to such conditions as ochronosis, congenital hematoporphyrinuria, albinism, lesions due to poisons, diabetes, hyperglycemia, retinitis, vitamin deficiency, gout, and the endocrinopathies.

George H. Stine.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Lijo Pavia, J. **The International Association for the Prevention of Blindness.** Rev. Oto-Neuro-Oft., 1933, v. 8, May, p. 190.

This is a report presented to the International Association by the writer, who represented the Argentine and Brazil and details the organization of blindness prevention work in those two countries.

M. Davidson.

Plimas, P. A. **Ocular examination of chauffeurs and motormen.** Sovietskii Viestnik Opht., 1934, v. 2, pt. 2, p. 172.

To faciliate recognition of traffic signals by the partially color blind, the author suggests that street signals be made to differ in form as well as in color. Vocational examination should determine acuteness of vision, field of vision, threshold of light perception, and color perception. Reexamination should be every three years, except in case of a progressive lesion which requires more frequent check-up. The visual need for drivers is not less than 0.7 vision in one eye and 0.5 in the other; and a field of vision in each eye not less than 60° out and 40° down. Nystagmus and diplopia contraindicate licensing for the two occupations referred to.

Ray K. Daily.

Posey, W. C., and Carris, L. H. **National Society for the Prevention of Blindness.** Arch. of Ophth., 1933, v. 10, Nov., pp. 621-630.

The organization, objects, policies, and activities of this lay society are presented in detail.

J. Hewitt Judd.

Scalinci, N. **Antonio Scarpa as ophthalmologist.** Ann. di Ottal., 1933, v. 61, Sept., p. 655.

This historical essay of thirty-four pages reviews the anatomical and surgical activities of a great Italian physician who was active in the late eighteenth and early nineteenth centuries. By his original investigations, his teaching, and his writing, he played an important part in creating an Italian school of ophthalmology which rivaled those existing in other European countries. Park Lewis.

Shoji, Y. **Moving pictures of ophthalmic operations.** Ann. d'Ocul., 1933, v. 170, Dec., pp. 1056-1061.

A cross-bar with side attachments fastens to the operating table so as to hold the camera above the head of the patient. The camera mounting is adjustable. Illumination is furnished by the operating room light.

H. Rommel Hildreth.

Talbot. **Prophylaxis of trachoma in the oases of southern Tunisia.** Rev. Internat. du Trachome, 1933, v. 10, Oct., p. 210.

The trachoma index varies from 75 percent at Zarsis, Gafsa, Ben Gardane, Tatahouine, and Médenine to 82.9 percent at Kébili, and 97 percent at Tozeur. Systematic treatment of school children over a period of three years has reduced the incidence of active trachoma in the schools by an average of 41 percent. Talbot notes that school infection is rare, contamination usually occurring in the family, particularly from the mother. A child who has escaped familial infection has a very good chance of escaping the disease in later life. Prophylaxis to be effective must protect the infant from maternal infection. Treatment is best carried on in the schools. Phillips Thygeson.

Verhoeff, F. H. **Ophthalmology as a career: Chairman's address.** Jour. Amer. Med. Assoc., 1933, v. 101, Aug. 26, pp. 649-652.

This address touches briefly on special characteristics of ophthalmic practice, and problems of education and licensure.

19. ANATOMY AND EMBRYOLOGY

Sondermann, R. **A study of the origin, morphology, and function of Schlemm's canal.** Acta Ophth., 1933, v. 11, no. 3, p. 280.

Schematic drawing and microphotographs of fetal and adult eyes show that Schlemm's canal originates from the fetal iridoscleral veins which become obliterated at the end of the third month of fetal life, except for the part which subsequently forms Schlemm's canal. They also demonstrate the morphology of Schlemm's canal, the system of inner and outer canaliculi connecting Schlemm's canal with the anterior chamber and the anterior ciliary veins, and the uveoscleral trabeculae at the angle of the anterior chamber in normal and glaucomatous eyes. To determine the function of Schlemm's canal the author made an oblique puncture of the angle of the anterior chamber of a monkey and enucleated the eye four hours later. Microscopic sections of this eye showed the process of resorption of the red blood cells thus introduced into the anterior chamber. The red blood cells could be followed through the inner canaliculi into Schlemm's canal and the outer canaliculi. Red blood cells were also found to some extent in the iris and ciliary body, but their part in the process of resorption seemed of secondary importance. Ray K. Daily.

NEWS ITEMS

News items in this issue were received from Prof. F. Terrien, Paris, France, and from Drs. F. C. Cordes, San Francisco, Charles P. Small, Chicago, Dr. O. P. Schoofs, Milwaukee, Wisconsin, and Harry Vanderbilt Wurdemann, Seattle, Washington. News items should reach **Dr. Melville Black, 424 Metropolitan Building, Denver, by the twelfth of the month.**

Deaths

Dr. George Ray Hare, New York; aged sixty-eight years, died, December 24, 1933, of pneumonia.

Dr. William B. Boyce, Escanaba, Michigan; aged fifty-nine years, died, December 31, 1933, of cerebral hemorrhage.

Dr. Clifford Earle Steckbauer, Chicago; aged thirty-five years; died, December 28, 1933, of a self inflicted bullet wound.

Miscellaneous

If a sufficient number of candidates are interested, the American Board of Ophthalmology will conduct an examination at Butte, Montana, July 16, 1934, at the time of the meeting of the Pacific Coast Oto-Ophthalmological Society. Applicants for the certificate should communicate immediately with the Secretary, Dr. Wm. H. Wilder, 122 S. Michigan Avenue, Chicago.

Dr. William L. Benedict of Rochester, Minn., presents in the winter issue of the Sight-Saving Review of the National Society for the Prevention of Blindness, his views on the use of popular lay treatment of ocular lesions. He gives a very sound and rational review of the improvement in the prevention of ocular accidents and ocular diseases. In the same issue of this Journal Dr. Arthur P. Wilkinson, Detroit, explains how the near-sighted child may become an introvert and how the far sighted child may develop into an extrovert.

The usual postgraduate course in ophthalmology will be given, April 20 to May 15, at the Clinique Ophthalmologique, L'Hotel-Dieu, Paris, by Prof. F. Terrien, assisted by Profs. Rathery, Regaud, Strohl and Tiffeneau, associate Profs. Velter and Zimmern, Drs. Ramadier, Renard, Cousin, Veil, Blum, Dollfus, Hudelo, Braun and Goulfier. The course will include, (1) an account of the newest methods in diagnosis and therapeutics, the latest developments in physiology, ocular neurology and physiologic optics, (2) the demonstration of improvements in surgical procedures and physiotherapy. Classes will be conducted by Prof. Rathery on "Diabetic lesions of the eye," Prof. Regaud, on "Ocular radiotherapy," Prof. Tiffeneau, on "Ophthalmological pharmacology," and Prof. Zimmern, on "Ophthalmic electrotherapy. The course will be divided into two series, (1) Clinic and laboratory, (2) Ocular surgery. The subscription is 300 francs for each series. Inquiries should be addressed to the Secretary of the Faculty of Medicine, Paris.

Societies

At the January meeting of the Milwaukee Oto-Ophthalmic Society, the following officers were elected for the coming year: president, Dr. O. P. Schoofs; vice-president, Dr. E. C. Bach; and secretary-treasurer, Dr. H. G. Schmidt. Dr. Sanford R. Gifford addressed the society on "Some phases of ocular therapeutics."

The annual meeting of the Chicago Ophthalmological Society was held, January 15, at which time Dr. E. V. L. Brown was elected president, and Dr. Thomas D. Allen, secretary-treasurer, for the coming year. The guest of honor, Dr. Roderic P. O'Connor, San Francisco, spoke on "Cataract extraction by the undetached conjunctival bridge method after preliminary iridectomy."

Personals

Dr. Charles F. Yerger has been promoted to associate clinical professor of ophthalmology at Loyola University School of Medicine, Chicago.

Drs. Callfas, Potts and Stokes, Omaha, Nebraska, announce the association with them of Dr. Harold Gifford, son of the late Dr. Harold Gifford, in the department of ophthalmology.

The board of directors of the University of Cincinnati College of Medicine has announced the promotion of Drs. Charles A. Hofling, Jr. and Horace W. Reid to assistant professors in the department of ophthalmology.

We desire to congratulate our distinguished colleague, Dr. Lewis Stephen Pilcher, editor of the Annals of Surgery, on his activity at the age of eighty-nine years. When a man has the energy to edit one of the leading surgical journals of the country at the advanced age of eighty-nine, he is some man.

Dr. Tomas R. Yanes, founder and director of Revista Cubana de Oto-Neuro-Oftalmiatria, was seriously wounded in pelvis and chest during the battle of the National Hotel, Havana, which played so important a part in the recent Cuban revolution. In the same battle Dr. Horacio Ferrer, who has published several papers in the American Journal of Ophthalmology, was made prisoner.

Dr. Harry Vanderbilt Wurdemann, Seattle, addressed the Portland Academy of Ophthalmology and Otolaryngology, Portland, Oregon, at the annual meeting, January 16, on the subject, "Traumatic neurosis following accidents affecting the eyes and vision." Dr. Wurdemann has recently accepted an appointment to the Editorial Staff of the magazine, "Eye, ear, nose and throat monthly."